

# ROADS AND STREETS

HIGHWAY CONSTRUCTION  
AIRPORTS  
HEAVY CONSTRUCTION

**SWITCH TO THE BEST BIT FOR THE JOB, RIGHT ON THE JOB!**



*Both TIMKEN® rock bit types fit the same drill steel!*

AS the ground changes on the job, you can change to the most economical bit right *on* the job—if you're using Timken® bits. They're interchangeable. Timken carbide insert and multi-use bits both fit the same threaded drill steel.

When drilling in ordinary ground use Timken multi-use bits. With correct and controlled reconditioning, they give you the lowest cost per foot of hole when full increments of steel can be drilled.

When you hit hard, abrasive ground, quickly switch to Timken carbide insert bits for greatest economy. They're your best bet for maximum speed, constant-gauge holes, small diameter blast holes and very deep holes.

By teaming up Timken carbide insert and multi-use bits, you put the best answer to every drilling requirement right at

your drillers' finger tips. Both bit types are interchangeable in each thread series. And remember that both have these three important advantages: 1) made from electric furnace Timken fine alloy steel, 2) threads are not subject to drilling impact because of the special shoulder union developed by the Timken Company, 3) quickly and easily removable.

Call upon the 20 years' experience of our Rock Bit Engineering Service for help in selecting the best bits for *your* job. Write The Timken Roller Bearing Company, Rock Bit Division, Canton 6, Ohio. Cable address: "TIMROSCO".

## TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

**your best bet for the best bit  
... for every job**

**TWO LPC TS 300 MOTOR SCRAPERS WORKED 4000 HOURS EACH...**

**with only 50¢ per hour per machine for ALL repairs!**

**Some of the Other Motor Scraper Features That Cut Earthmoving Costs**

- Big capacity... 14-yds. struck and 18-yds. heaped... to haul bigger pay loads each trip.
- Over 22 mph for speed on the haul road, to make more trips per hour.
- Your choice of power... a 280 HP Buda or a 275 HP Cummins diesel for fast acceleration and extra power when you need it.
- Big interchangeable tires for extra traction and flotation.
- Easy loading characteristics that cut valuable seconds off your cycle time.
- Extra high apron lift and positive forced ejection for faster, smoother spreading.



**That's really low-cost earthmoving for CONCRETE MATERIALS & CONSTRUCTION CO.**

FROM March 1 to December 24, 1951, Concrete Materials & Construction Co. operated their LaPlant-Choate TS 300s two 10-hour shifts, six days a week, stripping 120-ft. of overburden on a job near Cedar Rapids. In 4000 machine hours, total repairs for each rig amounted to only 50¢ per hour, and that included tires!

To get ready for the new season, engines were completely overhauled and the only repairs found necessary were new rings and bearings. After 4000 hours, the cylinders showed only .002 of an inch wear!

It's no wonder Concrete Materials is sold on Motor Scraper performance. On top of such low maintenance, their TS 300s give them the kind of power that easily handled materials varying from sandy loam to heavy blue clay in a pit loaded with springs, making the going plenty muddy.

**TWO YEARS' WORK IN ONE!**

BY working their TS 300 Motor Scrapers two ten-hour shifts a day, with such little time out for maintenance or repair, Concrete Materials & Construction Co. completed two years' work in one. This was a job where the Motor Scraper's ability to keep punching, with little time out for tinkering, really paid off. Minimum maintenance is just another reason why it will pay you to follow the lead of so many big-time contractors who cut earthmoving costs with LaPlant-Choate Motor Scrapers. See your LaPlant-Choate distributor today for complete details about all Motor Scraper advantages.

**LAPLANT**

MANUFACTURING CO., INC.



**CHOATE**

CEDAR RAPIDS, IOWA, U.S.A.



Cable-operated Scrapers in 6-, 8- and 14-yd. sizes for all makes of track-type tractors.



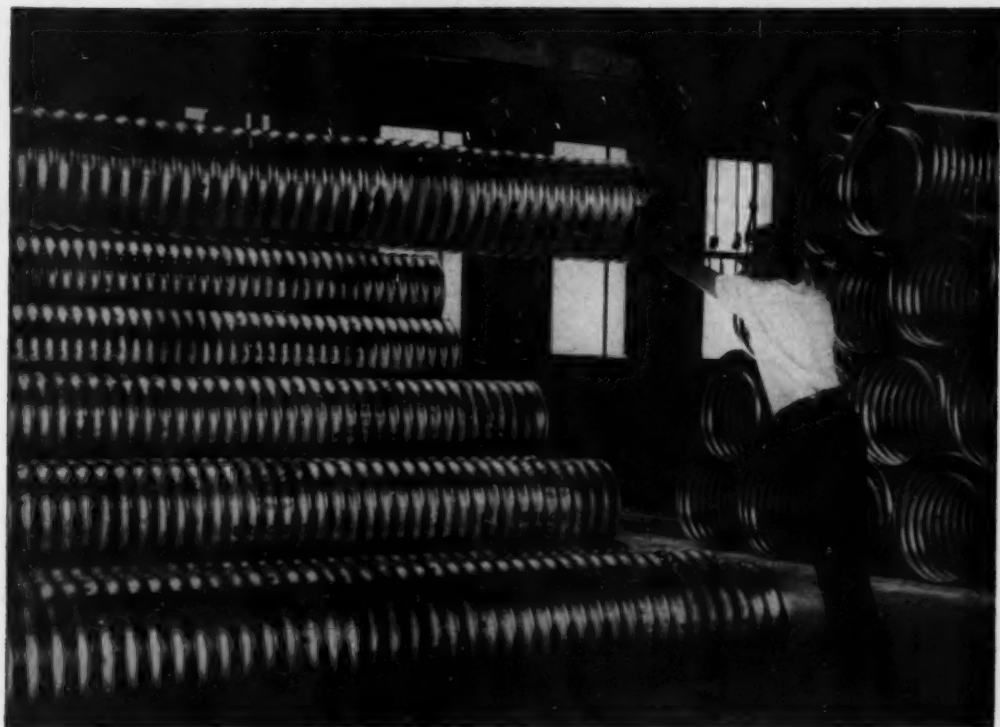
2- and 4-yd. Scrapers for track-type and rubber-tired industrial tractors.



Hydraulic and Cable-operated Dozers.



# You Pay Less for Longer, Lighter Sections Made of *GALVANIZED STEEL*



Culvert pipe of copper-bearing galvanized steel gives you advantages not found in ordinary culvert or drainage pipe.

Consider the question of weight. Galvanized steel pipe weighs less per ft and has higher tensile strength than pipe made from other materials. This favorable ratio of strength to weight allows it to be fabricated in longer, easier-to-handle sections. It can be placed in trenches by hand; it is easier to ship; it calls for fewer field joints.

Next, consider cost. Galvanized steel culvert pipe is economical from every standpoint. It is priced lower; it costs less to handle and ship; it costs less to install.

Bethlehem does not fabricate culvert pipe, but does manufacture Beth-Cu-Loy galvanized steel stock used by culvert pipe fabricators. This steel contains 0.20 to 0.30 pct

copper, and it more than meets the minimum specifications for culvert stock set by the American Association of State Highway Officials.

If you are bidding on a highway, airport, or park drainage job don't overlook the advantages of galvanized pipe. Any of our offices can give you full information.

**BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.**  
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

**BETH-CU-LOY**  
***GALVANIZED***  
**CULVERT SHEETS**



# ROADS AND STREETS

June, 1952

Vol. 95

No. 6

Roads and Streets represents 60 years of continuous publishing in the highway field; combined with Engineering & Contracting and Good Roads Magazines, established in 1892

E. S. GILLETTE, President and  
Publisher



HALBERT P. GILLETTE, Chairman of the  
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H. J. CONWAY, Assistant Publisher

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### Coming Articles

#### 3,000,000 Yards of Excavation without a Single Roller

Construction methods on the heaviest mountain road grading job most contractors will ever see—the U.S. 70 relocation in North Carolina.

#### Snow and Ice Stories in Midsummer's Heat

Yes, hot weather is getting-ready time in this field, and Roads and Streets will have several outstanding methods articles.

#### More Mechanization Ideas for Roadside Maintenance

Mr. Garmhausen of Ohio will present another series of pictorial reports on latest machines for roadside and landscaping work.

#### Concrete Piers 203 ft. High for Kentucky Bridge

Several bridges with phenomenally high pier shafts were built to relocate highways around Wolfe Creek reservoir. Design and construction details.

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A magazine devoted to the design, construction, maintenance and operation of highways, streets, bridges, bridge foundation and grade separations, and to the construction and maintenance of airports.

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# GALION 303

MODEL

## MOTOR GRADER

- All-gear tandem drive.
- Full hydraulic control.
- Dependable 50 h.p. diesel engine (gasoline engine available).
- Manual or combination manual and hydraulic steering.

### PROFITABLE PERFORMANCE ON MEDIUM- DUTY JOBS

It isn't profitable to use heavy-duty equipment on medium-duty jobs. The GALION 303 is a medium-size motor grader with all the operating features found on much heavier graders — yet it offers the economy of investment and operation necessary for profitable performance on those numerous medium-duty jobs.

Write for literature.



# GALION

ESTABLISHED 1907

## MOTOR GRADERS • ROLLERS

THE GALION IRON WORKS & MFG. CO., General and Export Offices — Galion, Ohio, U. S. A.  
Cable address: GALIONIRON, Galion, Ohio

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# Allis-Chalmers AD-40

## FIRST WITH BUILT-IN



You will do more and better work, do it easily and safely with the new Allis-Chalmers AD-40 motor grader. One big reason is the new built-in hydraulic power steering system—another Allis-Chalmers first in the motor grader field. The AD-40 is specifically designed to use this advanced system which retains the accuracy and roadability of mechanical steering . . . and adds the ease and smoothness of hydraulic steering. What's more, the hydraulic power steering unit is *inside* the head casting, with a short shaft to eliminate "spongy" steering. And hydraulic lines are enclosed in the frame . . . fully protected from external damage. See what **HYDRAGUIDE®**, the outstanding new power steering system, does for you on these jobs . . .



**ditching** is fast, accurate, complete. Hydraulic power goes to work for you the instant you start to turn . . . does most of the steering work for you. As a result you can turn far easier, far faster . . . work right up to culverts, poles or other obstructions before turning out.



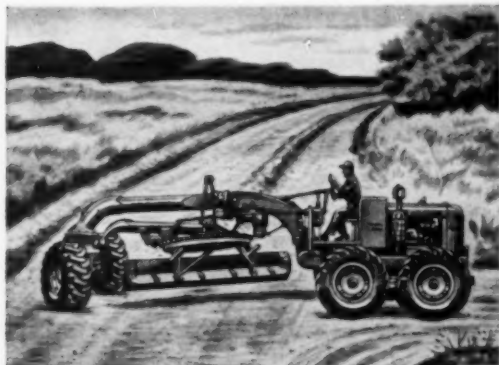
**plowing snow** — always a tough job due to added front-end weight of either blade or rotary unit—becomes much simpler . . . much more accurate when hydraulic power steering goes to work for you.



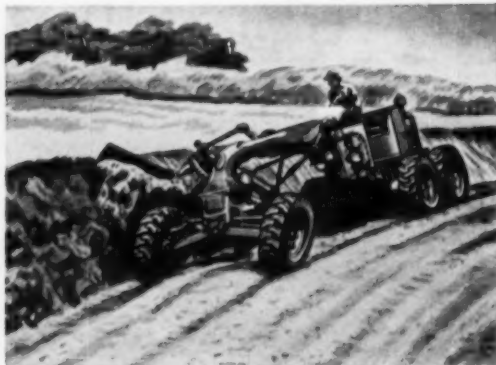
**muck, sand, soft ditches** are back-breakers no longer. Thanks to power steering, you pilot the wheel rather than wrestle it. Because of it, you can blade and turn at the same time.

**See your Allis-Chalmers dealer for the full story**  
*the Newest, Finest line on Earth..*

# MOTOR GRADERS A NEW KIND OF POWER STEERING



**turning around** is quick, easy, safe. With built-in power steering you can turn with just one finger—even while stopped. Fast, precise control greatly cuts down interference with moving traffic . . . gives you safe command even on dangerous mountain turns.



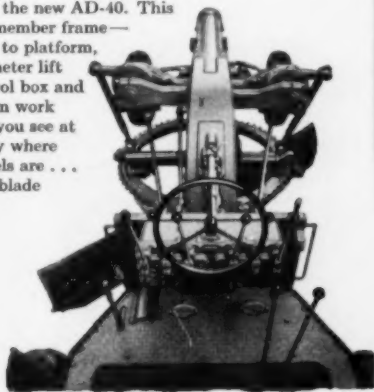
**bank sloping** is easier with the AD-40. Power steering gets you into position fast . . . lets you operate on steep slopes without the tiring "wheel fight" you've always known before. In addition, ease of control assures a smooth, even grade on every job.



**holes and bumps** cause no "wheel kick" because this new system cushions shock . . . keeps jolted front wheels from "steering back" at you. You turn only when you want to turn.

## you get full visibility, too!

Here's the view you have from the platform of the new AD-40. This grader's single-member frame—from front axle to platform, its smaller diameter lift cases, low control box and tapered platform work together to let you see at all times exactly where your front wheels are . . . just what your blade is doing.



# ALLIS-CHALMERS

TRACTOR DIVISION - MILWAUKEE 1, U. S. A.



# Blazin' Up the Blue Ridge

**TD-24s rip up 35,000 yards of rock that otherwise  
would have needed blasting**



**PUSHOVER FOR THE CHAMP.** The toughest work comes easy for the Big Red TD-24. This great International crawler digs in with 148 maximum drawbar horsepower—the most of any crawler on the market.

**HAPPY CONTRACTORS** Allan Siler and Fred Moore. As Mr. Moore says, "There are two ways to move rock: this way and by blasting. Our TD-24s saved us a lot of money, working rock loose long after every other tractor was through."



It was rough work to build a modern road from Charlotte, N. C., to the cool resorts along the Sky-line Drive, atop the famous Blue Ridge Mountains.

One cut and fill followed another—and one cut alone was 110 feet deep in solid rock.

That's where Macon Construction Company dug out 93,000 cubic yards of rock, and instead of blasting it all, they were able to doze and rip out 35,000 yards with two big red International TD-24 crawlers.

*"We have rock here that you couldn't touch with a dozer, till the TD-24 came along," says ripper operator Roy Cantrell. "Now we blade where we couldn't scratch before, and the ripper tears up rock that used to need blasting."*

And dozer operator Jess Leatherwood adds, *"My TD-24 pushes more, moves faster and handles easier than any other tractor—and I've run 'em all!"*

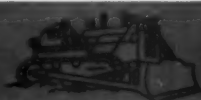
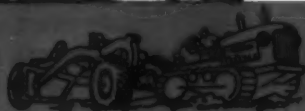
Get complete details on TD-24 capabilities from your International Industrial Distributor . . . and you'll be a TD-24 man yourself from then on in!

**INTERNATIONAL HARVESTER COMPANY  
CHICAGO 1, ILLINOIS**



**INTERNATIONAL**

**POWER THAT PAYS**



# with **BIG RED**



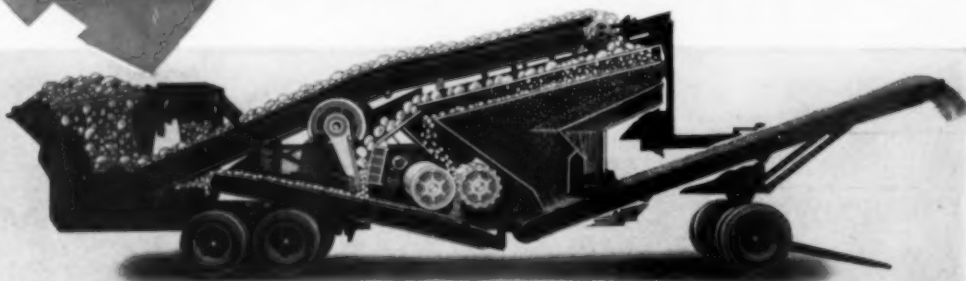
**THE WINNING TEAM.** "Deep down in the cut, it seemed every night would be the end of our ripping," says co-owner Fred Moore, "but the TD-24s kept right on going, showing how you can handle rock when you've got top power and traction."





# designed for **MORE PROFITS**

**WITH UNIVERSAL'S "SCALPING DECK" METHOD**

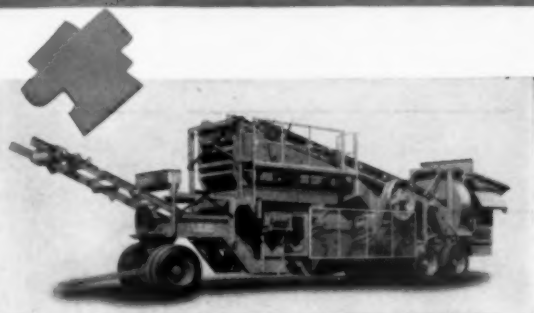


## **UNIVERSAL 880 GRAVELMASTER**

Universal's "Scalping Deck" method of screening assures balanced loads to the jaw and roll crushers . . . provides greater efficiency and economy, protects screen, jaws, and rolls. You get better gradation of material, less jaw wear, less roll shell wear, longer screen life, savings in power, more effective use of screening area, faster material flow, greater plant output. These all add up to more tons per hour at less cost per ton with the new Universal 880 Gravelmasters.

Strictly for profit . . . buy a Gravelmaster. Get top engineering design. Get the rugged stability of a permanent installation plus ready portability to produce profitably anywhere.

Complete, compact Universal Gravelmasters are built in a range of streamlined sizes with capacities from 75 to 270 tons per hour. They're used extensively as complete gravel crushing, screening and loading plants, or to step up production as secondaries following a primary in quarry operations. For complete details on the size that meets your requirements ask your Universal distributor or write.



### **THE NEW UNIVERSAL 880 GRAVELMASTER SENIOR "R"**

1036 roller bearing jaw crusher.

3022 roller bearing roll crusher.

Plant mounted power or side drive through universal joint from separate truck mounted power. An outstanding new high capacity Gravelmaster, designed to meet state highway weight limitations.

### **UNIVERSAL ENGINEERING CORPORATION division of PETTIBONE MULLIKEN CORP.**

631 C Avenue N.W., Cedar Rapids, Iowa  
Phone 7105

4700 W. Division St., Chicago 51, Illinois  
Phone Spaulding 2-9300



Here's Helmig's T6 TRAXCAVATOR loading sand and rock to make way for a commercial development. The 1 1/4 cu. yd. T6 is one of five TRAXCAVATOR models.



## "TRAXCAVATOR performance SOLD ME!"

*says Charles F. Helmig, contractor, of Pekin, Illinois*



If you've once tried a TRAXCAVATOR, you know there is no equal for its steady, day-after-day performance. Ask Charles F. Helmig, Pekin, Illinois, veteran of 34 years of excavating contracting.

He reports: "We bought our first TRAXCAVATOR back in 1938 and, with over 10,000 work hours to its credit, it still turns in a full day's work. The performance of that T4 sold us on the second and it proved even more successful on our work. Now we've got 4 TRAXCAVATORS—a T6, two T4s and an HT4—and we're giving them all a tough workout in all types of material. I like the way they buck into rock and come up with a load. We've tried others on our work of digging basements, levelling, ditching, tree-

pulling, loading, but none can measure up to all-around TRAXCAVATOR performance."

Take a hint from this veteran excavator. Try a TRAXCAVATOR on your job and see how it outperforms all others—in work done and in money saved. Your "Caterpillar" Dealer will be glad to show you a TRAXCAVATOR at work—call on him . . . or write direct.

CATERPILLAR TRACTOR CO., Peoria, Illinois

# TRACKSON

A SUBSIDIARY OF CATERPILLAR

TRAXCAVATORS®  
TRACLOADERS  
PIPE LAYERS  
ANGLEFILLERS

**YOUR CHOICE OF**

# **3 GREAT B-TYPE SCRAPERS**



**B-250**

(22 yd. struck, 27½ yd. heaped). Largest scraper in current production available for use with crawler tractors. Developed along with the International TD-24 tractor to fully apply its unusual working capacity.

(10 yd. struck, 14 yd. heaped). Engineered especially to work with the International TD-18A Tractor and make a matched dirt-moving team of championship caliber.



**B-170A**



**B-113**

(16 yd. struck, 21 yd. heaped). Has greatest struck capacity of the scrapers loaded without pusher assistance. Designed as the companion to the TD-24 tractor — takes full advantage of its superior speed and power.





Each of these three Bucyrus-Erie B-Type Scraper models loads with the same "fountain" action that breaks up chunks and boils material up through to fill the bowl completely.

Each hauls easily on big tires, and has the stability that comes with low bowl height, wide spaced rear wheels and proper weight distribution.

Each dumps fast and clean with the same positive *rolling* action — a type of ejection that requires less horsepower and thus permits dumping in higher tractor gear.

Each has the design refinements and strong construction throughout that mean extra ease of handling and servicing, extra yardage hauled, extra long life.

**BUCYRUS  
ERIE**

SOUTH MILWAUKEE, WISCONSIN

## BIG RED TEAM CONTINUES TO WIN ON PERFORMANCE

Time after time the Big Red Team — International TD-24 Tractor and Bucyrus-Erie B-250 or B-170A Scraper — comes out on top in actual field tests. It hauls more yards, loads and dumps faster, has shorter overall cycle time than comparable units. But why not find out for yourself? Ask your International Industrial Tractor Distributor for a demonstration.

8752C



When writing advertisers please mention **ROADS AND STREETS**, June, 1952



Day After Day After Day...

# Tuffy PERFORMANCE



**The Correct Measure of a Wire Rope . . .** is not the length or the initial cost per foot but the yards of materials it will move and the number of days it will stay in service without breaking. By those measures TUFFY draglines and TUFFY scraper ropes will give you the lowest ultimate cost of any wire rope you've ever used.

Here  
is  
Why...

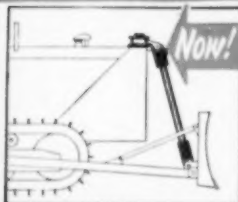
**EXTRA FLEXIBILITY** — Without sacrificing other qualities, Tuffy draglines and scraper ropes are built of the finest steel and designed for the special purposes — to take sharper bends, angle pulls and rapid line speed.

**EXTRA ABRASIVE RESISTANCE** — Super tough construction of TUFFY special purpose ropes gives them maximum resistance to

drum crushing abuse, crawling on guide rail flanges, etc.

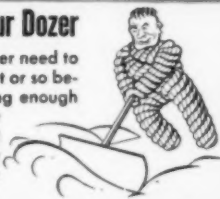
**EXTRA TOUGHNESS** — Union-formed (pre-formed) TUFFY construction resists heavy line pull, multiplied shock of load on slack line, the stresses of all types of material.

**EASY TO HANDLE** — Because TUFFY special purpose ropes are more pliable—spool better, ride better on grooves, hug drums when coiling on draglines.



## Mount a Reel of Tuffy DOZER ROPE on Your Dozer

**Stop Wasting 75% of Your Dozer Rope.** You no longer need to throw away 40 to 50 feet of dozer rope just because 10 feet or so becomes crushed or cut on the drum. Stop it simply by feeding enough new rope through the wedge socket to replace only the part that is damaged. Tuffy ½-inch Dozer Rope is now furnished in 150 ft. reels. Write for simple details on how to mount it on your dozers just back of the wedge socket. Save dozer rope footage and dollars.



... Yard After Yard After Yard ...

## REDUCES MATERIAL HANDLING COST



### The Easy Way to Order TUFFY Special Purpose

**Ropes** is to forget all about complicated wire rope specifications—all you need to do is to specify the diameter and the length and the name TUFFY Scraper, TUFFY Dragline or TUFFY Sling. Union Wire Rope engineers have developed wire rope constructions and wire fabric constructions to serve universally in specific fields of operation. All you need is—Length, Diameter and the name TUFFY!



### Tuffy SLINGS



**SUPER-FLEXIBLE, Super-TOUGH**—Tie Tuffy Slings into knots, kink them, flatten the eyes—and see how many more times you can straighten them without material damage, how cutting any one of the 9 parts of the interlaced wire fabric will not strand the sling. With every type of hitch, under any kind of load or pull, TUFFY Slings have proven their superiority. Each Tuffy sling is proof-tested to twice its safe working load. The interlaced construction makes possible eye splices with 95% of the fabric strength.

Tuffy Slings are available in 10 factory packaged types. Easy to order.



**union**  
*Wire Rope*  
**corporation**  
Specialists in Wire Rope

#### UNION WIRE ROPE CORPORATION

2300 Manchester Ave.

Kansas City, Mo.

Please send information on TUFFY Slings ... Draglines ...  
Scraper Ropes ... Digger Ropes ... Union-formed Wire Ropes.

Firm Name \_\_\_\_\_

Address \_\_\_\_\_

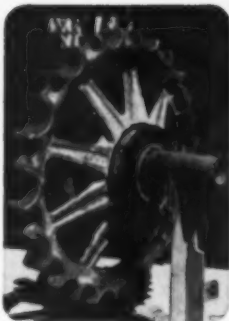
City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

# STOODY HARD-FACING

*outwears today's  
finest alloy steels!*

Even though equipment manufacturers select the best available alloy steel to build each tractor part, abrasion and impact ultimately destroy its usefulness. But this doesn't mean worn parts are discarded. Hard-faced with Stooddy Alloys, reclaimed parts become better than ever. Why? Because wear resistance of specific Stooddy Alloys is actually superior to the best of alloy steels. More wear resistance means longer part life, fewer replacements, less downtime and lower operating costs!

STOODY ALLOYS are the ideal maintenance tool for prolonging equipment life and reducing costs. Ask your Stooddy Dealer for application information today! Look him up in the "yellow pages" of your phone book.



**SPROCKETS** manually hard-faced with Stooddy Self-Hardening or Stooddy 1027 not only last longer but reduce bushing wear.



**IDLERS** are restored with Stooddy 105, applied automatically, for 2 to 1 life increase. Note smoothness of deposit.



**END BLADES** on this bulldozer stay square, retain full blade load when protected with Stooddy Self-Hardening 21. Note the cross pattern of stringers which packs a cushion of earth, saving hard-metal.



**TOP CARRIER ROLLS** keep spinning because Stooddy 1027 keeps them round.



**TRACK ROLLERS** are ideal for automatic hard-facing. Stooddy 105 doubles wear resistance, squares up cupped surfaces, reclaims rollers better than new.

## AUTOMATIC HARD-FACING

With Automatic Hard-Facing now available in nearby job shops, cost reaches a new low, quality is excellent. Ask for recommendations and list of local job shops—Your Stooddy dealer, listed in the Telephone Directory "Yellow Pages", will help you—or write direct.

**STOODY COMPANY**

1133 S. SHAWAN AVENUE  
WHEELING, CALIFORNIA



Loading out scrap material



Bulldozing



Industrial material handling



Backfilling foundations

## Take the Word of ...Thousands

Don't just take our word for the real, day-to-day usefulness of the Oliver "OC-3". Take the proof offered by the *thousands* of users . . . the *thousands* of uses . . . of this powerful little tractor. Just ask any owner what he thinks of his "OC-3". In the more than 12 years that the "OC-3" and its predecessor, the "HG", have been in production, they have built a reputation for user acceptance that's unequaled in their class. Proof of this is the fact that it's mighty hard to get a used "OC-3". Users just don't often sell their "OC-3" tractors.

With an "OC-3" and its broad line of matched equipment . . . bulldozer, trailbuilder, front end loader, lifting fork, sidewalk snow plow, hydraulic drawbar, winch, logging kits, and many others . . . you can perform all sorts of useful tasks *every day*.

The "OC-3" has plenty of power to handle all those jobs with ease . . . a full 22 drawbar h.p. It's ruggedly built to keep maintenance and operating costs down.

Why not have your Oliver Industrial Distributor give you all the facts on the "OC-3", the lowest priced industrial crawler tractor built. Call him or write direct to The Oliver Corporation, Industrial Division, 19300 Euclid Avenue, Cleveland 17, Ohio.



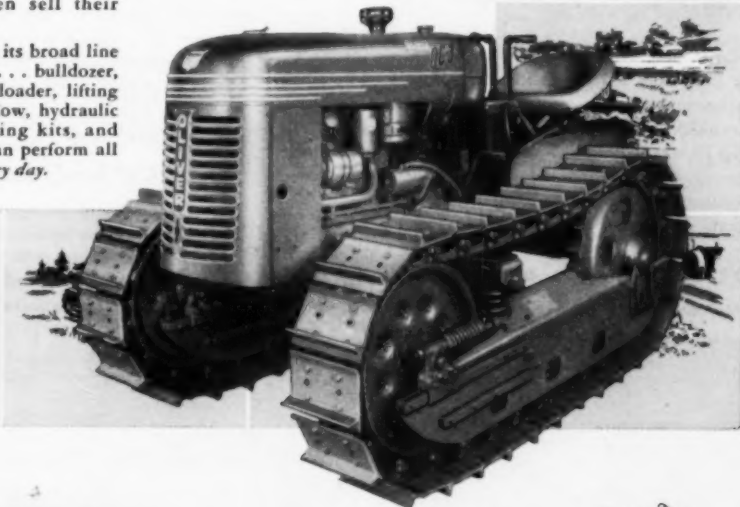
Sidewalk snow plowing



Loading out topsoil



Winch operations



### THE OLIVER CORPORATION

a complete line of industrial wheel and crawler tractors





# "Nothing like Tournapulls"



C Tournapull at Hillsboro



*says A. E. Williams,*

owner of A. E. Williams Construction Co., Hartford, Connecticut. "The all-around performance of our first 'Pull, a 7-yd. D Roadster, convinced us that electric-control LeTourneaus can beat tracks and other rubber-tired rigs on short and long hauls, in any kind of material or weather. That's why we bought 2 new 14-yd. C Tournapulls and a Tournadozer. These units have done an excellent job on housing, road, and land-leveling work . . . nothing like 'em for profitable, low-cost grading."

**"D" moves 88 yds. an hr. on 900' cycle**

On a typical housing job—moving 30,000 yds. of loam at

Chester Bowles Park subdivision in Hartford—the fast, mobile D Tournapull, though it had to weave in and out between buildings (and even stop occasionally for dumping instructions), still averaged 16 trips, 88 pay yards hourly on a 900-ft. cycle. Self-loading to grade, it got 5½ pay yards in 45 seconds and 60 to 75 ft. Spread took 20 seconds and 25 to 50 ft.

## "C's" load, dump big boulders

On a typical road job—relocating State Route 9 near Hillsboro, New Hampshire—Williams profitably loaded both D and C Tournapulls in the same cut with the same pusher. All 3 units hauled sandy clay mixed with large boulders. Some of the rocks were larger than a beach ball,

Tournapulls in hillside cut on U.S. 9 near Hillsboro, N.H. Two "C's" are in foreground; "D" is coming up behind one "C".



Push-loading scrapers at Bradley Air Field, Connecticut, Tournadozer regularly serviced 5 units on hauls from 200 to 3000 ft.



**R. G. LeTOURNEAU, INC.,** Peoria, Illinois

HIGH-SPEED, RUBBER-TIRED EXCAVATING • HAULING • LIFTING EQUIPMENT

# for low-cost grading,"



**D Tournapull at Hartford**

yet they were easily loaded and dumped through Tournapull's big apron opening.

## **Tournadozer push-loads 5 scrapers**

On a typical land-leveling job — excavating and grading for an airplane factory at Bradley Air Field, near Windsor Locks, Connecticut — Tournadozer push-loaded 2 self-propelled and 3 crawler-drawn scrapers on hauls of 200 to 3000 ft. In spare time, it cleared brush, backfilled culverts, handled scattered maintenance jobs.

All 4 LeTourneau units saved time and money for Williams Construction Co. between jobs, too. Rather than being hauled around on trailers, they were driven job-to-

job under their own power. Tournapulls, for example, made the 100-mile trip from Hartford to Hillsboro over main highways in 5 hours, total driving time. In another move, the D Tournapull hustled 3 miles across the city of Hartford in 15 minutes.

## **Check performance on your job**

This ability to drive fast from job-to-job, plus the ability to work fast under adverse conditions on the job, are reasons why you, too, will find it pays to standardize on Tournapulls and Tournadozers. Today's electric-control rigs are good profit insurance against the future . . . assure you the pick of jobs. Get all the facts from your LeTourneau Distributor. Call him . . . there's no obligation.



Total production of Bowline Division for the D Tournapull, 17,500 yds. per a 10-hour shift. Tournapull, 17,500 yds. per a 10-hour shift. Tournapull, 17,500 yds. per a 10-hour shift.



**TOURNAADOZERS\***



**TOURNAPULLS\***



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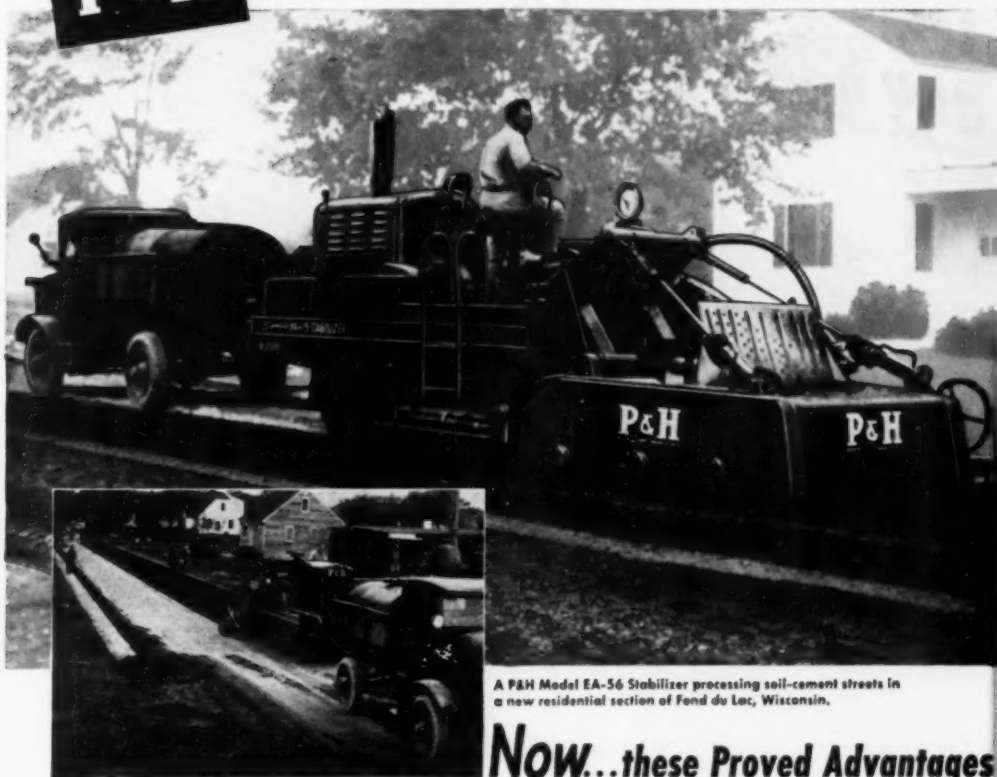
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Construction superintendent directs and coordinates operations over the Motorola 2-way radio—talking right now, and regardless of location, to working crews located at remote points of your operation.



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This new, smaller P&H Stabilizer — the Model EA-56 — processes in 5-foot strips — making it ideal for street, highway, alley, airport and other kinds of jobs. It performs with all the economy and quality control of the larger P&H Stabilizers — processing native soils or aggregates with any type of admixture into a fine, lasting base of uniform and predetermined strength. The P&H machine is for granular, bituminous and cement soil stabilization work.

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# Before you buy any Mixer check KWIK-MIX



**16-S DANDIE®**  
advantages

- ✓ **ADJUSTABLE, DOUBLE-CONTACT SHAKER** on skip, with contact at each end of skip frame, has vertical shaking action. No twisting strain.
- ✓ **AUTOMATIC WATER SYSTEM**, accurate to fraction of a pint, combined with exclusive blade-and-bucket re-mixing action, produce consistent quality concrete every batch.
- ✓ **8-SECOND DISCHARGE** . . . tilted Flow-Line Discharge Chute, available only with Kwik-Mix, reaches deep into drum, discharges full batch in 2½ revolutions, saves seconds every batch.
- ✓ **INTERCHANGEABLE** side or end discharge . . . mixer can be changed from side to end discharge in less than an hour, because axles are easily interchangeable on square frame.

**MOTO-BUG®** . . . labor-saving power wheelbarrow takes all heavy manual work out of hauling, backing up, spotting, has full power forward and reverse . . . no push, no pull necessary. 10 cu. ft. hopper converts to 1500-lb. flatbed, fork lift, scraper blade.

- ✓ **3-POINT SUSPENSION MOUNTING** on heavy coil springs (2 at each corner of rear, and 1 double-coil arrangement centered at front) absorb high-speed operating and travel shocks.
- ✓ **HEAVY CAST-STEEL DRUM HEADS** with machined roller paths . . . independent engine clutch . . . multiple V-belt drive . . . Tower Loader for overhead discharge . . . special 90° skip, are other 16-S features worth checking.

Before you buy any mixer, get all the facts from your Kwik-Mix distributor on this big-production 16-S Dandie. Other sizes: 11-S, 6-S, 3½-S . . . also, bituminous, tilting and non-tilt plaster-mortar mixers, and Moto-Bug.

To: KWIK-MIX Co., Port Washington, Wis. Send new catalog on 16-S Dandie, also:

NAME \_\_\_\_\_ ☐ 11-S ☐ 6-S ☐ 3½-S  
 COMPANY \_\_\_\_\_ ☐ 10 ☐ 14 ft. bituminous  
 STREET \_\_\_\_\_ ☐ 6 ☐ 10 ft. plaster-mortar  
 CITY, STATE \_\_\_\_\_ ☐ Tower Loader ☐ Moto-Bug

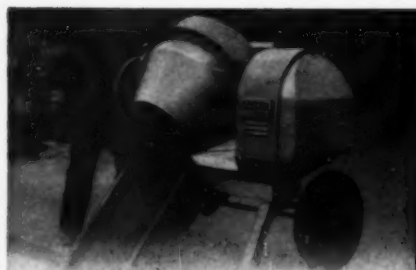
**KWIK-MIX**

COMPANY • Port Washington, Wis.  
(Manufacturing Subsidiary)



CKW240REV.

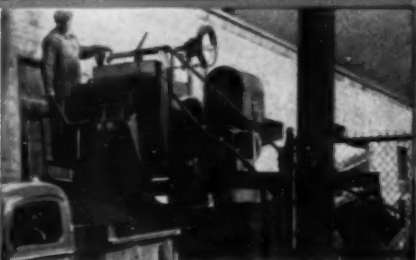




3 1/2-S DANDIE is sturdy, light, portable for on-the-spot mixing . . . Kwik-Mix line also includes a 3 1/2 cu. ft. non-tilting model.



2-WHEEL 11-S end-discharge, non-tilter, is also available on 4 wheels, side or end discharge for thorough Dandie-mixed concrete.



KWIK-MIX BITUMINOUS mixers . . . 10 and 14 cu. ft., are readily adaptable as stationary plants or as highly mobile 4-wheel units.



FOR DISCHARGE AT 7'-5" HEIGHT . . . Kwik-Mix Tower Loader fits 11-S and 14-S mixers . . . is also available for bituminous mixers. Loads into trucks, forms, overhead hoppers, or handles stockpiling. Collapses for travel.

## 17-FT.-DEEP Parsons 310 Trenchliner\*

With 45 digging feeds, this big-capacity 310 Trenchliner produces from 8" to 15 1/2' of clean, smooth-walled trench per minute . . . digs 1 1/2' to 4 1/2' wide at 17' depth with single boom, and up to 6' wide at 11' depth with dual booms. 310 has full reverse of all operations for undercutting or making vertical set-ins . . . is equipped with easy-in, easy-out "Tap-In" teeth. Parsons line also includes 4 Trenchliners in smaller sizes.

**PARSONS** (Koehring Subsidiary)  
Newton, Iowa



## EASY-CHARGING Johnson Lo-Bin Batcher\*

Lo-Bin Trolley Batcher holds 8, 20 or 30 tons . . . is only 7 1/2' to 9 1/2' high for charging with front-end tractor loader. Lo-Bin has 2, 3 or 4 compartments, up to 4 weigh beams, 22 or 44 cu. ft. weigh hopper . . . or can be arranged for 2 or 3 aggregates and 1 bulk cement compartment. Efficiently serves 28-S, 16-S, 11-S, 6-S mixers. Lo-Bin is quickly dismantled, easily moved by dump truck. Optional: wheels, tires, tow-bar.

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## HIGH-DISCHARGE Koehring 16-E twinbatch\*

Here's a portable mix plant with controlled elevated discharge for all types of concrete construction. Boom on Koehring 16-E elevates 60°, swings in 160° arc. Bucket discharges controlled batch up to 21' (higher with special boom). 16-E produces up to 50 cu. yds. per hour, exceeding larger 27-E single-drum paver. Drives 6 m.p.h. on rubber tires job to job. Also check big Koehring 34-E twinbatch for major paving.

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# PAYLOADER®

THE FRANK G. HOUGH CO. • Since 1920





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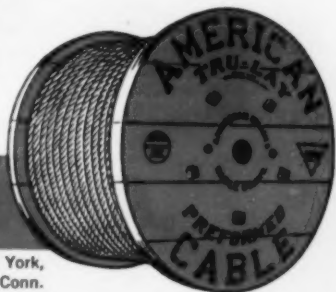
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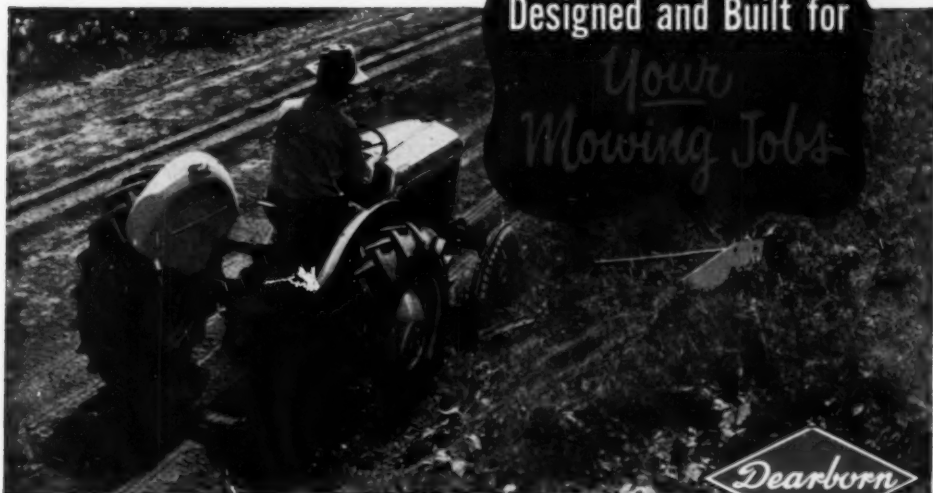
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National Marketing Organization for the Ford Tractor and Dearborn Equipment



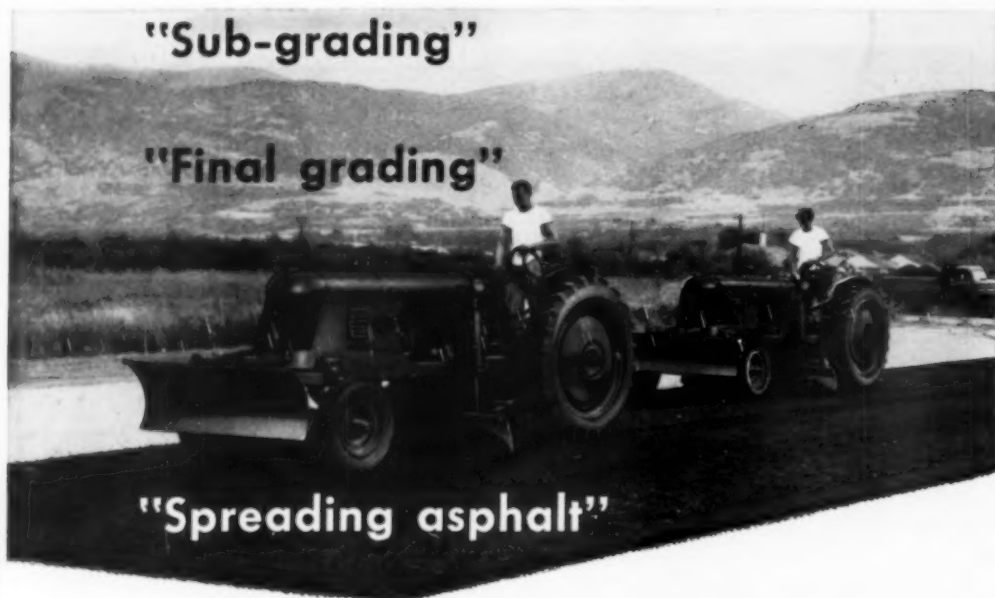
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**5 NEW  
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10 to 31-ton cap.

**Engineered to increase your  
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HOISTS**

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S-HBC-1



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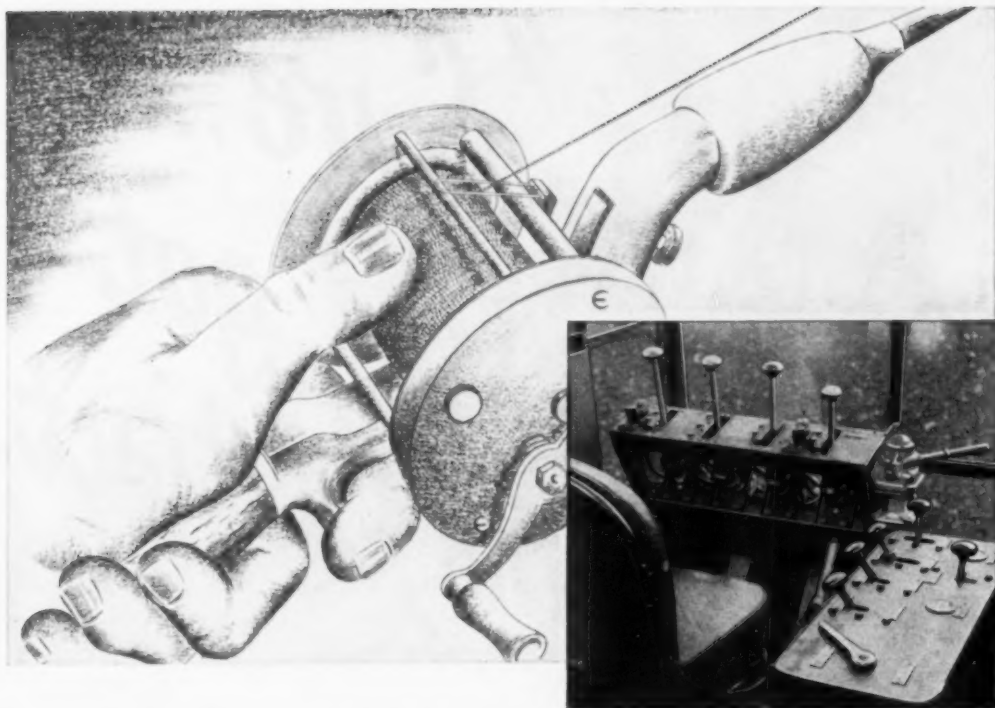
Concrete costs less to maintain than other pavements as proved by average cost figures from official records of 28 State Highway Departments that report maintenance figures by type of surface. Concrete highways

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Moderate first cost + low maintenance cost ÷ long life = **low annual cost**. With durable, **low-annual-cost** concrete less paving money is dissipated on maintenance, leaving more funds available for new construction.

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A national organization to improve and extend the uses of portland cement and concrete . . . through scientific research and engineering field work



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### *Right under your thumb*

With LIMA precision air controlled clutches and brakes you get the same smooth, easy, responsive control of the hoist and drag lines that you do when you apply the under-the-thumb tension to the line on a fisherman's reel

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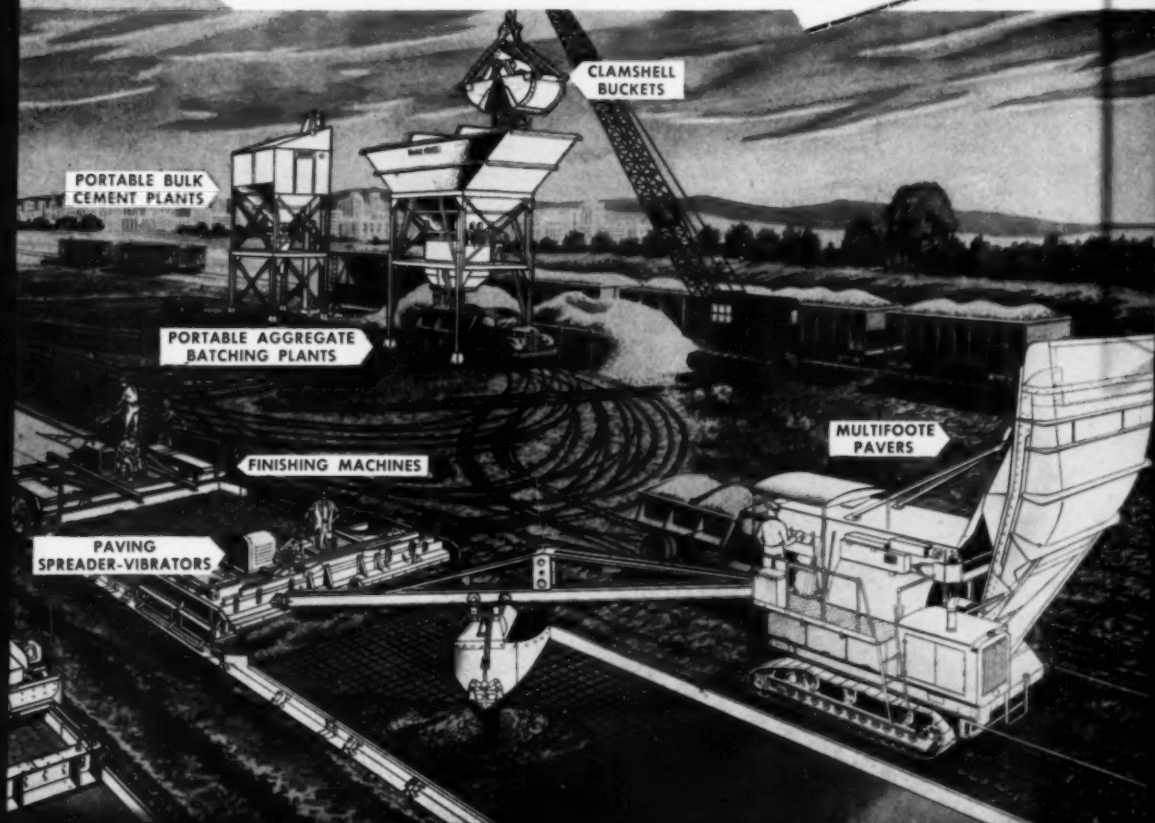
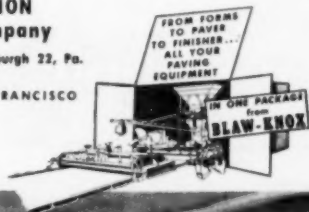
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**QUESTION?****Road or Bridge Across Gorge**

**Problems settled by extra-strength structural steel plate pipe design. Installation carrying 138-foot maximum fill on road job in Alabama excites wide interest. Embankment construction required ingenuity by earthmoving crews.**

**By J. F. Tribble**

Assistant Construction Engineer,  
Alabama Highway Department,  
Montgomery

**A**N obsolete line of US 31, the Bee-line Highway from the Gulf to the Great Lakes, has been crying for relocation since 1940. This link starts about 60 miles north of Birmingham, Alabama, near Cullman, and consists of 11 miles of road from the Appalachian Plateau down into the Tennessee River valley.

Serious route surveying and engineering planning were resumed shortly after World War II. The existing route, paved in 1922, surrounds the canyon-like gorge of Hurricane Creek which is crossed on a low fill over a 10 ft. x 12.5 ft. reinforced concrete culvert. This culvert is more than adequate.

The controversy over whether to hit the gorge head-on or use an intermediate route with moderate alignment but a good grade line, raged for two years. The head-on route with maximum 1°-30' of curvature, has excellent alignment and, between common points, is four miles shorter than the existing route and one mile shorter than the intermediate route developed. The key to decision lay in the mile of very rugged terrain in the vicinity of the gorge. Remaining mileage is quite comparable. The shorter gorge route was chosen in Aug. 1949. Contract was let Jan. 20, 1950, for the grading work and all drainage except in the gorge.

The geometric design of the road project is to Federal Interregional Standards. The traffic volume anticipated within the next several years is

hardly enough to justify initial 4-lane construction. A 2-lane design to provide 22-ft. width of pavement on a 42-ft. roadbed was used. In the right side, ascending the steeper hills, an additional lane was provided for trucks. Right-of-way was secured for ultimate development of a 4-lane design. Since the section over the gorge is in a sag-vertical curve between two 7% gradients and the trucking lanes right and left overlap, a 4-lane effect at this point is created. Under the circumstances, however, it would have been sound planning in any case to have developed the ultimate cross-section through this rugged terrain. Paving will be plain portland cement concrete, 9 in. thick. At roadbed elevation the required embankment width is 68 ft out to out of shoulders.

**Road or Bridge?**

As previously stated, drainage requirements in the gorge are definitely in the culvert range. The culvert of the existing highway is more than adequate, and very little water is added to the stream between old and new routes. However, when you stood on the south rim and looked north, as in Picture 1, or on the north rim and looked down into the gulch, you did not think in terms of a culvert but of a bridge—big, high bridge. The defile is 150 ft. deep and about 600 ft. across at proposed highway grade line. A 4-lane bridge was indicated; so, you pictured tall steel trestle work, concrete arches or a very deep gracefully arched truss span crossing in one sweep. These structural solutions were

1. Looking across the gorge before work began





2. Looking North along centerline during erection of third line of pipe. Note extra longitudinal bolting. Road embankment will cover highest rocks at top of picture

investigated and compared in cost, but a very prosaic 3-span continuous steel plate deck girder bridge on tall concrete piers proved to be the most economical bridge. Such a design was developed and detailed. It appeared to be quite feasible prior to the Korea trouble. The only feasible design was an embankment across the gorge.

Independent studies of the watershed and hydraulics involved were made by engineers of the US Geological Survey, US Bureau of Public Roads, Armo Drainage and Metal Products, Inc., and Alabama State Highway Department. All findings and conclusions were remarkably consistent.

### Culvert Studies Begun

Approaches to culvert design included a study of rigid structures. Concrete arch culvert, r.c. box culvert and r.c. pipes were all considered. The design for the rigid box culvert required was extreme. Foundations available did not give an arch-type culvert any advantage. Thinking then went to flexible steel types. The engineers consulted in the hydraulics field worked out general features of an installation using two lines of 102-in. diam. structural steel plate pipe double-bolted (8 bolts per foot). For maximum capacity, hydraulic characteristics of the installation contemplated 2.5% invert gradients, special intake and discharge conditions, and still the

possibility of an occasional surge of as much as 25 ft. water depth over the top of the pipes at the inlet end. The Bureau of Public Roads had its structural engineers study this design and they did not concur with the State. They were not satisfied with the strength of the joints developed, and the proposed height of fill above pipes was entirely outside precedent for the 102 in. size.

At this stage serious consideration was given to use of the proposed embankment as a dam for a recreational lake. For handling the creek then, a shallow-cover r.c. box culvert could be constructed on the cliff, with a side-hill spillway down to streambed. The idea was not well received, legally or physically, with the flow of water normally available. The economic minded advocates, however, saw even after consideration of the saving in pipe length, that there would be increased cost of converting the already expensive embankment to a dam section, as well as an adverse factor to the safety of this important traffic link. This idea was dropped.

This 600-ft. length of roadway was made an exception in the over-all road project, but the grading of the rest of the job was rapidly nearing completion. In view of this fact, one more conference of all concerned on April 23, 1951, brought agreement on the basis of changing the two-pipe design to three 84-in. lines with the same maximum plate thickness and less critical joints. About 10% more net waterway opening was provided. Availability of the necessary plates was promised. The designers now had a basis for getting plans before bidders. The solution provided a normal-width road across the gorge, assuring greater traffic safety and only normal maintenance.

The definite location of the installation, established on the site, had to be on a 5°-47' skew in order to fit the ravine and get as much of the bedding as possible on undisturbed foundation. A 2.5% invert gradient was

maintained and a good runoff area provided. The maximum fill above pipes was established at 138 ft.

The sources for structural design criteria were the Marston Theory of loads on highway culverts.\* The culminating decision was that portions of the pipes under fill exceeding the maximum for 84 in. size, with standard plate thickness and bolting, would be made of No. 1 gauge plates, and that bolting of longitudinal joints was increased by 50%; that is, six bolts per linear foot. As fill height decreased under slopes, plate thicknesses and boltings were also decreased, all in accordance with the AASHTO Tables.

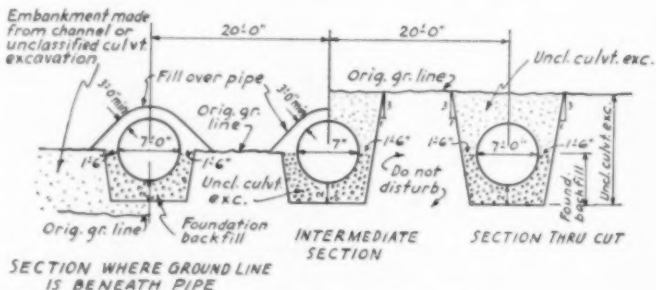
### Careful Embedment Required

As a further precaution and addition to the safety factor, a partial condition of "Negative Projecting Conduit," as developed from the Marston Theory, was to be provided by construction of an "Imperfect Ditch" in the compacted embankment over each pipe. The outline of the installation is shown in the accompanying sketch.

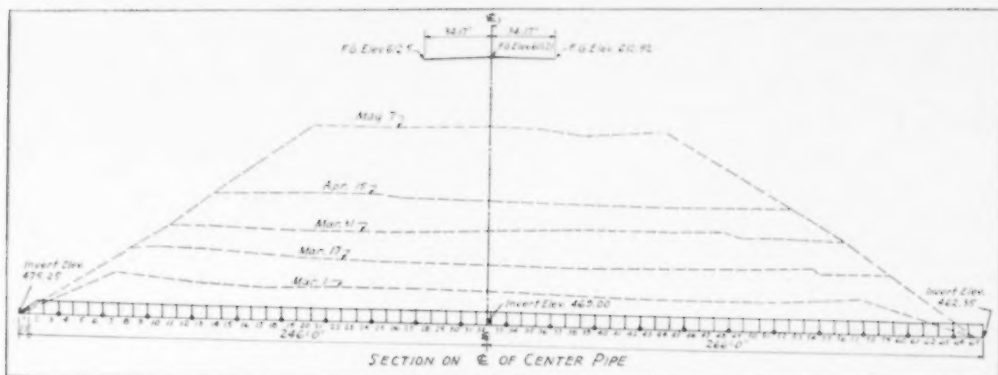
A 2-foot uniform thickness of creek-bed sand was specified for bedding. The size of rock within 2 ft. under and 3 ft. over the pipe was limited to 4 in. Compaction required under and between pipes is 100% AASHTO Standard. Three feet above each pipe a 10 ft. by 7 ft. imperfectly backfilled ditch is provided.

All plates are required to be painted during erection, with one coat of Koppers' Bitumastic 50. Strutting is required to stay in place until after completion of all embankment. After strutting is removed, one-third of the

\*As developed and presented by Professor M. G. Spangler in Volume 26 of Highway Research Board Proceedings and more recently in Volume 30, the Corrugated Plate Investigation conducted for AASHTO Bridge Committee by Professor M. J. Huber and Mr. L. D. Childs; also as presented in Michigan Engineering Experiment Station Bulletin 109; the current revisions of plate pipe tables of AASHTO Standard Specifications for Highway Bridges which are based upon Bulletin 109; various tables and data supplied by "Armco" and "Tonnac" as applicable to the situation and live loadings of H20-S16.



★ Cross section of 84-inch pipes, showing bedding and trench details



★ Cross section of fill at pipe, showing details of settlement observation points referred to in the accompanying table. Ring point indicators mean that readings were taken at joints between sections of pipe.

### Elevations on Invert of Pipe

Date of Reading	Ring Point																					
	3-4	6-7	9-10	12-13	15-16	18-19	21-22	24-25	27-28	30-31	33-34	36-37	39-40	42-43	45-46	48-49	51-52	54-55	57-58	60-61	63-64	
Feb. 11, 1952	475.16	474.54	474.12	473.38	472.72	472.27	471.69	471.07	470.49	469.92	469.28	468.73	468.16	467.54								
Mar. 1, 1952	475.14	474.50	474.12	473.37	472.72	472.24	471.65	471.04	470.46	469.89	469.23	468.70	468.09	467.49	466.75	466.08	465.51	464.88	464.19	463.61	463.00	
Mar. 17, 1952	475.01	474.49	474.06	473.34	472.65	472.21	471.64	471.01	470.43	469.86	469.21	468.67	468.06	467.46	466.71	466.05	465.47	464.84	464.17	463.59	462.93	
Mar. 31, 1952	475.00	474.46	474.02	473.30	472.61	472.17	471.57	470.93	470.38	469.80	469.15	468.60	467.99	467.40	466.64	465.97	465.42	464.79	464.13	463.54		
Apr. 15, 1952	474.99	474.46	474.01	473.29	472.58	472.13	471.53	470.89	470.34	469.76	469.12	468.58	467.95	467.37	466.61	465.92	465.37	464.75	464.10	463.54	462.86	
May 7, 1952	474.96	474.42	473.96	473.22	472.50	472.03	471.40	470.82	470.27	469.68	469.04	468.49	467.87	467.29	466.53	465.89	465.33	464.75	464.10	463.54	462.86	

circumference of the pipes at the invert is required to be paved at least one inch over corrugations, with bituminous plant mix binder course. This is followed by a one-inch layer of a very tough cold-fluxed, asphaltic limestone mixture.

The intake ends of the pipes are to be beveled to fit 1½:1 fill slope. The discharge end is cut vertical and goes 10 ft. beyond toe of slope.

A steel-cable boulder-deflector fence on 42-lb. BP. steel piling set in concrete, is required about 100 ft. ahead of the inlet. A construction change provides for a concrete curtain wall to go to a depth of 12 ft. under the flow-line, all across the ravine. It is founded partially on rock. After completion of fill and removal of struts, grouted riprap is required on the fill slopes around both ends of the pipes. A rock discharge apron, 5 ft. thick, with a top 12 in. grouted, is required all across and for a distance of 80 ft. downstream from pipe ends. Concrete current breakers and retarders are built on it.

Construction changes also provided a line of 6 in. Helcor pipe underdrain along outside lines to relieve and drain springs in the foundation for bedding. This discharges into the apron.

Due to anticipated inundation, the first 25 ft. height of embankment is required to be built with 2:1 slopes, using 50% rock of 4 in. minimum size, choked with sand. The remainder of the embankment is on 1½:1 slope and

while built of rock choked with sandy soil, has no specific requirement as to size. Embankment layers are required to be kept as thin as possible in keeping with size of rocks, then choked and rolled to 95% AASHTO density wherever it can be measured.

Borrow pits are adjacent to the right-of-way, north and south of the gorge.

### Construction Procedure

Contracts for construction are under:

#### 3. Stream temporarily diverted by each dam

1. Proposal "D," which covers furnishing and installation of the pipes and all backfill and other items related to drainage.

2. Proposal "E," which is only for the large embankment across the gorge and related erosion control items.

Proposal "D" was awarded to A. L. Crowe construction Company of Birmingham, Alabama, June 5, 1951, and work started July 6, 1951. Progress was intermittent due to floods and interruption for grading.



4. Erection procedure on prepared bedding



5. Brush-painting outside of pipe as erection progresses



7. Filling under, around and between pipes. Note pneumatic powered tampers



8. Over-all view of filling operations. Pipe spacing permits use of large equipment

The first work was diversion of the stream to make way for laying the first line of pipe. Picture 3 shows this diversion and a portion of one line in place, the erection of which is shown in Picture 4. This erection is on previously prepared sandy bedding material 2 ft. thick. The bedding is not shaped to receive the pipe but the material is forced under the metal by use of special tools and power tampers. It was specified that the sand be forced under the corrugations hydraulically but this did not work; the sand did not drain fast enough.

40

Springs were encountered in the foundations for bedding. These were handled in pipe underdrains installed under supplemental agreement with the contractor.

In Picture 5, a portion of one pipe has been erected and is being brush-painted with Kopper's Bitumastic No. 50, preparatory to placing bedding material under sides of pipe. Spray painting was permitted. Bolts were run up tight by use of pneumatic impact wrenches. As new bolts were tightened, previously tightened ones were

inclined to loosen. Following the air wrenches, all nuts were checked by hand wrenches and if not already tighter were run up to a minimum torque of 150 ft.-lb. Although the AASHO requirement in this respect is 200 ft.-lb., the designers considered 150 ft.-lb. adequate in this instance.

Because of the disturbance of the earth between pipes by removal of large boulders, a construction decision permitted taking out all material between the two pipes shown on the left, in one trench. (The pipe on the right

6. General view of bottom of gorge during erection and bolting of portion of middle pipe





side of Picture 6 is carrying the water). It was considered that any replaced embankment would be better structurally than the disturbed earth. This has an important bearing on the ultimate loading of the pipes.

#### Air Rammers Used

Filling under and on sides of pipes with sandy bedding material is shown in progress in Pictures 7 and 8. Soil is being tamped under and adjacent to the pipes by use of air rammers with special tools. Selected material is brought to the installation in trucks and spread by bulldozer and by hand. Compaction between pipes is by sheepsfoot roller. This backfill material does not have to be so sandy and drainable but must be free of oversize rocks.

After excavations were made in the floor of the gorge, designers were not satisfied with the apron required on the intake end and a concrete cut-off wall was built from bank to bank as previously noted. At the same time the location of the boulder deflector was changed. Picture 9 shows starting of excavation for this cut-off wall. It was poured by stages. The 12 ft. depth went down to solid rock in a few places.

Pictures 10 and 11 show steps in placing struts to hold pipe 3% out of round, vertically, while embankment is being placed. Six 25-ton hydraulic jacks were used to start this work, which was then carried on with four jacks.

Picture 12 is a close-up of the same strutting showing condition of cap blocks on March 31, 1952, when the pipe was carrying 45 ft. depth of the ultimate 138-ft. embankment.

#### Embankment Construction

The embankment contract, Proposal "E" was signed and approved Nov. 16, 1951 and work order issued Nov. 29, 1951, but due to several floods in No-



9. Excavation started for concrete cut-off wall at intake



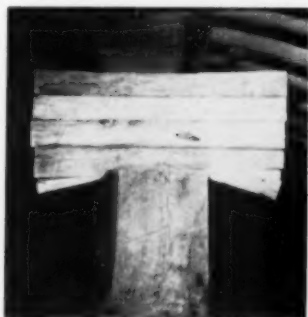
13. Starting the embankment—first job was to get "levee" over inlet in case of spring floods



10. Two 25-ton jacks between sill and cap strain pipe



11. Two jacks on other side make way for 2 1/2-in. over-length strut



12. Close up of cap crushing under 45 ft. of the 138-ft. fill



14 and 15. First haul road down from the south borrow pit were as steep as scrapers could handle

ember and December which broke the levee and took out a lot of the pipe backfill, the actual start of embankment work was delayed until Feb. 4, 1952. The contractor is Carlton Contracting Company of Albany, Georgia.

The borrow pit sites are adjacent to the project on both sides of the gorge.

The south side was opened first, for fill in Picture 17. The material is a crumbly sandstone and was used to make a larger levee over the inlet end of the pipes. The first 25-ft. depth of material over the pipe had to be very rocky in nature; hence work on the rock portion had to be put in operation early. Pits on both sides were soon being used. The most general idea about building an embankment in this location was to spill the material down

into the ravine, then pick it up at the bottom and place it with other equipment that stayed on the bottom. In fact the contractor tried that plan and soon found it too expensive and too dangerous.

#### Steep Haul Roads

He then planned steep haul roads down into the gorge from both sides. These are shown in Pictures 14 and 15. It will be noted that both of these roads had to be built in stages. In Picture 14 the pioneer transverse side-hill road used to spill the material down to the ramp below it is still in evidence.

A similar plan had to be worked on the north side. In order to provide the desired density and guard against fu-

ture settlement, choking was accomplished by placing embankment layers alternately, using first rock then earth. For the first 10 ft. depth of cover, rock was kept away from the area directly over the pipes; or, if any encountered, it was dozed to the slopes. The reason for this was to keep from disturbing the banks when the imperfect trench had to be excavated.

#### Ingenuous Trenching

As shown in Picture 16, the contractor deserves credit for some ingenious planning in the trench operation which would seem to be normal dragline or back-hoe work. For a shovel it goes backwards. As observed in this Picture at the end of the fresh dirt, a cut of about 10 ft. long was made and spoiled. The shovel then backed away 8 or 10 ft. along the culvert axis, made another top-down cut, and backfilled the first one with the material thus excavated. This continued over all three lines of pipe for about 1,350 lin. ft. Cutting started about 30 ft. back from the slope. All operation completed in less than two days.

After haul road details were worked out and the tedious job accomplished of placing fill over and around pipes and preparing for the imperfect trenches, the embankment started rising rather fast. Picture 17 shows the embankment when up to a height of 43 ft. over the inlet end of the pipes. The difference in heavy rock base for the fill shows distinctly in the picture. The change in embankment slope is also quite apparent. The contractor, operating his hauling equipment an average of 55 hours per week from both sides of the gorge, was excavating about 7,000 cu. yd. per day. The well organized procedure was beginning to make a good showing.

16. Digging "Imperfect Trench." A fresh cut is made every 8 or 10 ft. and previous cut backfilled





17 (Right) Upstream side at height of 43 feet

18. (Above) Permenco auger-type drill used for horizontal blast holes



Drilling for blasting was done at night. The soft sandrock pit was drilled by three wagon drills and six jackhammers which were powered by one 500 and one 315 cfm. Gardner-Denver air compressors. These units operated in the usual manner, with shots being put off at all night hours.

Blast holes for the hard rock borrow on the north rim were bored horizontally into a 6 in. to 8 in. seam of soft shale by means of a "Permenco" auger type power drill, shown in Picture 18. Where this drill can be used in this manner, it takes the place of well drills. Depending upon overburden, 3 in. or 6 in. augers are used spaced 3 ft. to 6 ft. apart and 40 ft. to 50 ft. deep into the face. The hole is about 8 ft. above from the pit floor and has a burden about equal to the depth of the hole.

Holes are charged with large sticks (35 to 40 lb. each) of 40% strength dynamite at a rate of 0.5 lb. per cu. yd. of excavation. A good job of blasting resulted. Practically no secondary shooting (dobies) was needed for loading by a 2-yd. Lorain 820 power shovel, was served by seven Euclid wagons. Note the well blasted rock. These layers are spread as thin as practical, considering the size of the rocks. Rock layers are next choked with sandy borrow.

An 8-ft length of the pipes is left off until after completion of the embankment, as a matter of protection. Note the fascines covering the pipe stubs to give protection against large rocks coming down the slope.

The "overhang" shown in Pictures 1 and 2 is being blasted away. To avoid possible damage to the embankment, seepage water is to be intercepted and carried out to the toe of the slope. Pipe under drain

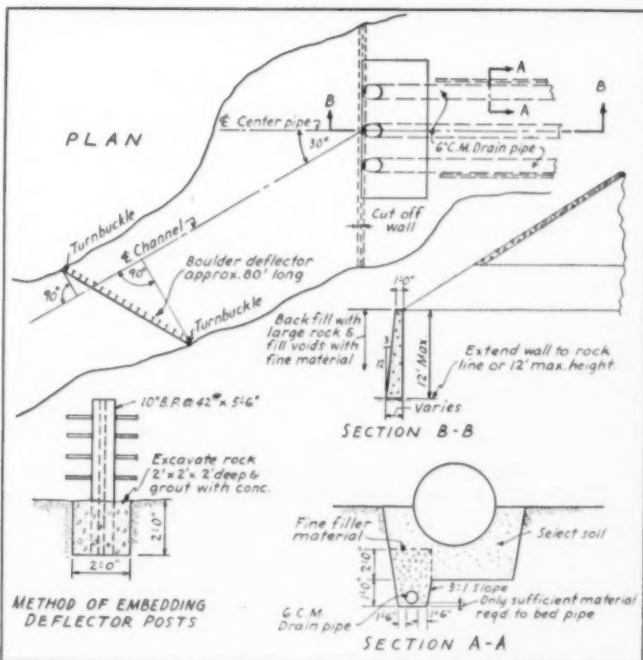
interceptor is to be laid above the shelf.

An outfall toe-ditch was dug to handle drainage from the large ravine. Since opening the rock borrow pit on the right above, it will be feasible and helpful to pipe capacity, to bring ravine drainage down on one side of the highway.

The borrow sites on the south side involve more ordinary operations. A

Linkbelt Speeder 1½ yd. shovel does utility digging around this area. The material is a very crumbly, friable sandstone. It has to be blasted but after blasting, handles easily with power equipment. Earth moving and placement is down by six carrying type Caterpillar and Garwood scrapers.

Embankment compaction is done by a dual-tandem sheepfoot roller pulled by a Caterpillar D 8 tractor. A port-



★ Construction changes included a concrete cut-off wall at the outlet and carried across the gorge; also a line of perforated pipe under one line of culvert pipe



19. Rock loading for the big fill, using Lorain shovel



20 and 21. Spreading well blasted rock on lower lifts of the fill

able light plant takes care of night drilling. An electric welder is kept on the job for general service to the equipment which is undergoing constant punishment of the most severe nature. One motor grader helps spread embankment layers and takes care of the very difficult haulage roads.

**Schedule:** Work on the pipe installation contract is suspended at this writing, pending completion of the embankment, which was to be about June 1, 1952. Strutting is to be removed, tail sections completed, invert paving placed, grouted rip-rap placed on slopes and aprons, and painting completed. Bids are to be taken for the final-stage highway paving on June 27.

#### Loading Investigations

During strutting operations and just prior to starting embankment work, instrumentation was set up by Armco Drainage and Metal Products, Inc., for measurement of pipe behavior under loading while strutted and then under full load unstrutted. Load cells and SR-4 strain gauges will continue under observation and data will then be released by Armco. Settlement and compression records have been kept by the State Highway Department. Measurements at other fill heights will be recorded as they become available. Results, so far, show about one-half of the 6-in. camber placed in culvert construction has now settled out, due to loadings.

#### Vertical Diameter Changes During Embankment Construction

Fill Above Pipe	Ring 9	Diameter at Ring 15	Ring 22
3'	7'-6.40"	7'-5.60"	7'-5.80"
10'	7'-5.70"	7'-5.46"	7'-5.78"
10' (Trenchbed)	7'-5.56"	7'-5.48"	7'-5.78"
25'	7'-5.52"	7'-5.04"	7'-5.62"
40'	7'-5.52"	7'-4.70"	7'-5.51"
60'	7'-5.56"	7'-4.43"	7'-5.34"
100'			
138'			

#### In Conclusion

The pipe installation contract with A. L. Crowe amounts to \$154,000. The contract for filling across the gorge is with Carlton Contracting Company and amounts to \$370,000. The previously executed contract with Hardaway Contracting Company for the 7 miles of line in which the gorge was excepted amounted to \$330,000. It will be seen therefore, that the cost of grading and drainage on this one 600-ft. section of road was 60% more than for all the rest of the 7-mile project of which it is a part. A pre-Korea estimate of the cost of a bridge across the gorge was \$550,000.

In direct charge of the work for the State is L. T. Burleson, project engineer, and his assistant, C. W. Gibson, M. C. Davis is district resident engineer. Construction is under supervision of H. D. Burnum, division engineer at Decatur, and Marvin Taylor, state construction engineer. Technical adviser on the pipe installation is Boyd Steed, Engineer for Armco, with engineers of the U.S. Bureau of Public Roads cooperating. Ed Smith is superintendent for Carlton Contracting Company on the grading.

#### Readers' Comments

To the Editor:

I have had an opportunity to review your letter and your write-up and editorial on the Morocco Air Base project, and I want you to know that your fair and factual story is appreciated.

In these days of politics and publicity-seeking Senators, we, as constructors on the job, are very much discredited by the wild statements made in most cases by witnesses who did not know what they were talking about. Factual statements, such as those published in "Roads and Streets", will be of great help in advising the people what actually took place in Morocco.

We appreciate that the headlines have told the story and nothing we can say, or can be said in the many publications whose editors believe in fair play, will receive the notice accorded to the headlines as published in the daily press. We are distributing a brief brochure to our stockholders and friends, a copy of which is enclosed.

Please accept our sincere thanks for your very fair and constructive article.

H. W. Morcoson, President,  
Morrison-Knudsen Company, Inc.  
Boise, Idaho



# Expansion of "PAR" Group Voted at Washington Meeting

*Project - Adequate - Roads Committee given new impetus at meeting held in conjunction with Fourth Annual Highway Transportation Congress*

The organized groups of highway users in the U.S. have girded for a new highway promotion push, in reflection of the growing public stir over the lack of adequate highway facilities. Moving on from its organization meeting last February the Project-Adequate-Roads Committee—already known familiarly as "PAR"—met in Washington May 6 to discuss the next forward steps in furthering the National Good Roads Movement it spearheads.

This committee which represents some forty industry and highway user organizations has been working under a temporary operating committee. At the May 6 meeting, with L. S. Wescoat, President of the Pure Oil Co., presiding, the membership agreed to select a permanent chairman, vice chairmen, executive committee, and necessary working committees such as public relations, engineering, finance, etc. The permanent chairman was to have been chosen soon following this meeting.

Secretary of the PAR committee since its inception is Arthur Butler, director of the National Highway Users Conference which sponsored PAR's formation.

The May 6 meeting was held in conjunction with the Fourth Annual Highway Transportation Congress.

The problem of setting up PAR state committees was discussed as the first immediate job of the National committee. The first such committee has been formed in Tennessee, headed by Clark Akers, chairman of the Tennessee Highway Users Conference. It was emphasized however that the role of the national committee would be that of an advisory service. The flexibility of local groups is essential to a sound and effective highway promotion, since the needs of each state are different. "Deviation in practice but adherence to principle," aptly describes the PAR set-up.

In his report to the membership Secretary Butler cited a wealth of publicity as evidence of the soundness of the PAR movement, which has as its slogan, "Adequate Roads for a Stronger America." The enormity of

the task is outweighed by the opportunity it offers for public service, said Mr. Butler.

The PAR committee includes among its membership such groups as the U.S. Chamber of Commerce, the National Grange, the American Trucking Associations, Construction Industry Manufacturers Association, the National Association of Motor Bus Operators, the American Automobile Association, the National Association of Manufacturers, and others.

## Taxation No. 1 Problem

PAR's proposed special committee on highway taxation, administration and finance will find itself with a number of read-made jobs. One might well be to focus attention on the manual which is to be prepared by a subcommittee of the Highway Research Board, with a view to speeding its completion. This manual would provide a guide for the states on tax-

tion and finance. Once it is finished, PAR's special committee on finance may find it desirable to stimulate the use of this impartial manual by state study committees authorized by the legislatures.

Highway finance is the phase of the problem on which there is probably least agreement. Right here in this room, there are many opinions. For example, we do not all think alike on the matter of toll roads. And some of us may feel that it is time for a re-examination of our position on this question.

We do not all think alike on the matter of "linkage." Some of us want the Federal government to allocate to the states all the revenues collected in Federal automotive excise taxes. Others of us, wanting LESS BIG WASHINGTON, not MORE, prefer another solution altogether. Some of us, including many highway users, feel that a real solution lies only in the repeal of Federal automotive excise taxes and the substitution of state highway user taxes for them, with the provision, of course, that these state taxes be used for the highways. Studies are being undertaken now on what kind of legislation would be necessary to accomplish this purpose.

# Better Roads

ONE OF the healthy symptoms of the vitality of capitalism is the interest big business is taking in the public good. The public good, of course, means ultimately the good of all, including big business, but this interest is as far from narrow selfishness as democracy is from dictatorship.

A recent instance of what we may call enlightened self-interest was the full page advertisement in newspapers over the signature of Harvey Firestone Jr., chairman of the tire and rubber company of that name. The advertisement was not trying to sell tires; it was trying to sell a program of modern highways.

Nazi Germany was able to build its marvelous autobahns on the dictatorship principle. Here in America we would rather go back to cow paths than follow that line. We don't have to go back. We can go forward in the way we have always advanced, by public demand.

We need modern highways badly. We need them in the national interest, in the event of the extreme emergency of war. We need them in interstate, state and local interest, to cut down deaths and injuries, to relieve congestion and to unshackle the movement of industry.

Recently 40 national organizations, representing highway users, industry, agriculture, etc., got together to push a program for good roads. It is to the benefit of everyone to support this project. That is how to get things done in America.

★ Editorial in The Chicago Herald American, May 27—typical of the enthusiastic reaction over the "PAR" committee



## Federal Excise Taxes Can Spark a Real Road Program for both Civilian and Defense Needs

Many different plans and ideas are afoot for doing something about the Nation's highway system. All of us have talked about the unsatisfactory condition, in the over-all picture. Many of us are doing what we can toward correcting the deficiencies, subject of course to those to whom we report. When not politically pressured, our highway engineers are placing new construction where it will be of maximum benefit to motor vehicle operators.

Lack of funds to keep up with traffic demands, added to the problem of highway obsolescence, has caused Paul B. Reinhold, President of the American Road Builders, to present a plan that has much in its favor. This plan, which Mr. Reinhold admits is no panacea but only one solution, is to spark a greatly enlarged Federal-aid highway building program by appropriating for roads a larger percentage of Federal funds now collected from automobile excise taxes and federal gasoline taxes.

In his plan Mr. Reinhold cites the fact that today's highways are inadequate, in many cases worn out, and certainly not being replaced or modernized fast enough to keep pace with our growing vehicular traffic.

### Serve Dual Purpose

In the face of this he cites the fact that some government agencies are calling for a plan which will assure adequate highways for all-out defense of the nation. As Mr. Reinhold sees the picture our problem is *not* solely one of providing a defense highway system. We are at least equally concerned, he feels, with promoting daily transportation facilities that are adequate for the growth and expansion of our American way of life. Definitely, he has a point here.

The conclusion therefore is that the roadbuilding job

is to build *civilian highways* on a scale that will accommodate the possible military defense needs. In so doing we will achieve mobility for our vast vehicular population, and we will automatically produce a highway system that can be instantly converted to military use. It is equally as important to protect our peacetime prosperity as to prepare for war.

### Put Excise Taxes to Work

It is unnecessary here to show wherein just the Federal-aid highway system is deficient. It can be shown that this deficiency amounts to about \$32 billion. From whence would this money come? Mr. Reinhold shows that beginning in 1942 collections of automobile excise taxes by the Federal government amounted to \$625 million annually. Only 20 per cent or \$125 million of this sum went in 1942 for roads. The figures for succeeding periods show that the ratio of highway expenditures to excise tax collections has decreased to date. These annual Federal-aid appropriations lately have supported a \$1½ billion annual state highway construction program.

In view of the immensity of the task, Mr. Reinhold suggests that a 10-year Federal-aid highway program operating at a \$3 billion per year construction level be adopted. We must take this money and time and build with it not a network of special military highways but an adequate and modern network of highways that will provide excellent peacetime transportation and be immediately convertible to military use.

This plan has been presented to the road sub-committees of both the House and the Senate of the U.S. Congress.

Mr. Reinhold is to be commended. His plan is logical and feasible. We'll soon see how much foresight and intestinal fortitude our Congressmen have.

## Alert Management in the Public Interest

The Virginia Department of Highways staged a spring clean-up and repair program this year which is an example of the kind of alert service every state ought to have—but not all do. When signs pointed to an early spring following an exceptionally mild winter, the Department leaders called the maintenance force together and planned a Blitz program of surface patching, shoulder shaping, ditch cleaning, channel clearing, sign and marker renovation, etc.

Begun on March 17 and completed by April 25 over the entire system, the program helped secure mid-summer highway conditions by the beginning of summer. Alertness and quick timing thus paid off by getting the roads into shape ahead of schedule for the heavy

traffic and vacation season.

The early start also cleared the deck for an earlier beginning of surface treatment, heavy road repairs and other routine summer work. The "stitch-in-time" factor minimized wintertime wear and tear, and the improved drainage assured better protection to roadbeds during a season of normally expected rains. An inter-district rivalry, coupled with concentration of effort, helped everyone get the tasks done with efficiency and economy.

It is hoped that the people of Virginia were told fully of this example of alert, tax-saving service. Probably they were, since the Virginia department is also

a leader in public relations, mindful that the public and its leaders must constantly be kept aware of the

vital role of highway transportation and the need for increased funds for road modernization.

## Contract vs. Force Account Contest Futile

North Carolina, famed recently for its socialistic tendencies toward roadbuilding with public forces, is in the news again. Two pairs of projects are being set up in an attempt to find out whether state forces can build roads more economically than private contractors. Seven or eight pairs of such projects are planned.

This contest will be valuable if it helps gather fresh data on the various elements entering into highway construction job costs and management; we need much more of such data. With the able Production Cost Committee of the Bureau of Public Roads cooperating, the study will be in good hands.

But if the prime purpose is to weigh the policy of force-account construction, the contest must be evaluated carefully. Even if the jobs set up for comparison are seemingly as alike as identical twins, the results will be hard to compare in deciding the policy question involved. No two roadbuilding projects are ever truly alike in physical conditions. Even greater is the disparity in the management factor.

### What of the Future?

To be sure, it will be shown that the force account job saves the state the elements of bonding cost, insurance, taxes and profit, which elements a contractor must figure in his bid. Labor-force projects, under the spur of special comparison, may be managed with drive and ingenuity comparable to that of a contractor with his financial existence at stake (as it is on every job). But year in and year out public organizations inherently cannot maintain the efficiency incentive that private contractors must show to survive in open competition. Even a better-than-average performance by the state crews in this instance will set up a dangerous precedent for the future in North Carolina and other states. We say this, mindful of the fact that the North Carolina highway department is one of the nation's best, with many able career men.

Competition is the great spur of human endeavor, and contractors' bid prices are lowest when there is keen competition for the work at hand. Bidding has been spirited in North Carolina; a million-yard earth-moving job recently went for 26 cents a yard which is low indeed for these times.

If the prime purpose of the cost-comparison projects is to furnish competition, they hardly seem necessary. Not when contractors who are experts at competition can be offered a steady volume of work from year to year, around which they can build and maintain alert, highly mechanized organizations.

A contractor keeps his staff trimmed for top efficiency. In contrast a state highway department once it builds a construction staff will find it hard to get any-

one off the public payroll. This fact of life is evidenced in all government.

Government-in-business . . . where is it going to end! State highway construction over the nation has been comparatively free of the tendency to supplant private work by public construction. Let us all help keep it that way, so that businessmen can still create jobs, pay taxes, and help maintain the American way of life which is based on private initiative.

None of us should forget the mechanical revolution that has occurred in roadbuilding since mule-and-fresno days. Private initiative under the spur of competition by profit-hungry machinery manufacturers and contractors—and *this initiative alone*—has brought this astonishing progress about. North Carolina's excellent highway system is largely a monument to this initiative under past and present state highway administrative regimes.

While the North Carolina highway officials are at it, why not set up another type of contest to determine how much of the maintenance and repair work usually done by maintenance employees can be turned over to contractors on a competitive bid basis. Everyone might be surprised at how many contractors would be interested in such work, once assured that the state would annually advertise a steady and sizable volume of it. While the state maintenance departments often do a good job (see reference to Virginia on these pages) much of the maintenance-type of work can profitably be set up for contractors, as some states such as Ohio are proving.

A somewhat unforeseen problem in the designing of urban expressways came up recently in Chicago, when citizens in large number complained of the traffic noise for the newly opened Edens Parkway entering Chicago.

More than 1,600 residents whose homes face the 300 foot right-of-way for this parkway signed a petition protesting against the racket made by trucks and asking that trucks be ruled off of the route.

A survey of the situation was undertaken by the Cook County highway department as a guide in taking action here and in connection with future problems. Also an appeal was made to the public to ask the co-operation of truckers in the matter.

Noise is an old problem along arterial highways, and a great deal of it is inherent in the speed of rubber tired motor vehicles. Education to reduce horn and muffler noise is the immediate solution. Wider right of way and possibly the use of baffling lines of shrubs and trees or the construction of baffle walls would seem to be the only way to bring rural quiet to expressway neighbors.

**IT COSTS LESS TO BUILD GOOD ROADS THAN TO HAVE POOR ROADS**



★ Grading completed by Stamey Const. Co. at Mile 83 (west of West Tulsa) as shown by Bermuda grass tufting of fill slopes

## SELECTING THE PAVEMENT TYPE FOR Oklahoma's Turner Turnpike

This article reviews design features of the Nation's third largest turnpike project, now graded and planned for opening late this year

By Col. V. J. Brown  
Gillette Publishing Company

OKLAHOMA is proud of Turner Turnpike. This latest of turnpike toll roads extends for 88 miles between the western limits of West Tulsa and the eastern end of the four-lane freeway over which U.S. Route 66 is located for about 8 miles northeast of Oklahoma City. As the alignment map shows, there will be six interchanges, one at each end and one near each town of Chandler, Stroud, Bristow, and Sapulpa. Accompanying drawings show the cross sectional design and a picture shows the pavement cross-section. The job is scheduled for completion in December, 1952.

The typical grading section should be explained a little. The notation on the diagram "16½ in. of classified grading material"—shows material

that is placed as such by the grading contractor. This is compacted as required and has an transverse slope of ½ in. per ft. It is placed and compacted up to the "Grading line."

### Typical Grading Section

When the paving contractor comes in he roots up 4½ in. of this material, 24 ft. wide, under the pavement area. The quantities moved out as shown by the single cross-hatched areas are just equal to the quantities required by the double cross-hatched areas. Into the single cross-hatched area trenches, the paving contractor then places 7 in. of crushed stone, highly compacted, with which some soil binder has been mixed. After this is rolled and surface finished, the next course consisting of 3 in. of coarse graded asphaltic hot-mix is laid, and finally the top course of 2 in. of hot-mix hot-laid finer graded asphaltic concrete is placed, rolled and finished.

Six inches of top soil is placed on the center median, and grass planted. The shoulders are stabilized and surface treated. Incidentally, ditch cheeks are made of planted Bermuda grass, also.

At present there are 64 separate

contracts under construction. This is a result of the limitations per contract made effective on this project. For grading and drainage projects it is \$500,000 per contract and they average 3 to 5 miles in length. The bridge limitation is \$1 million per contract. The largest number of bridges to date has been five per contract. Paving is also limited to \$1 million per contract which gives approximately 5 to 9 miles per job.

A \$41,000,000 bond issue was sold all at once at a premium of \$347,000 for financing, in August, 1950. The bonds were delivered in November, 1950, and construction started December 19, 1950. \$1 million was kept in a working account. The balance of the money was used to buy U.S. Treasury Notes and Certificates that draw from 1¼% to 1¾% until the money is needed. The bonds draw an interest rate of 4% and mature over a 40-year period. They start amortizing 8 years after receipt of the money. Because of the reinvestment program, interest during construction has been reduced to about 2½%.

The most widely publicized development in this project is the switch from

portland cement concrete pavement to asphaltic concrete surface. The two types of surfacing under discussion at this time were:

1. 8 in. of portland cement concrete paving on 4 in. of sand base.

2. 6 in. of hot-mix hot-laid asphaltic concrete paving on 6 in. of high type crushed stone base.

Either of these systems was to rest upon two 6-in. compacted layers of selected sub-base material having the following requirements.

a. For the lower 6-in. course the material must have a CBR of at least 8 and a PI of less than 10.

b. For the upper 6 in. the CBR must be 10 or more and the PI not to exceed 9.

The argument that developed at the beginning was the contention that for concrete paving with 4 in. of sand base, the top 6-in. course of the 12 in. of sub-base was unnecessary and put portland cement concrete out of competition with asphaltic concrete if the total 12 in. of sub-base was required.

All lettings to date, after the final adoption of equivalent load supporting types, have contained designs and specifications for both types, but in each letting the low bid has been for asphaltic concrete.

In October, 1951, H. E. Bailey, General Manager, Oklahoma Turnpike Authority, prepared a report entitled "Paving Maintenance Report." This report summarized maintenance figures compiled from other states on the two types of pavement under consideration. It also called attention to the controversy over the subbase design. A Portland Cement Association representative's remarks made at a hearing held March 20, 1951 claimed that portland cement concrete would be placed at a competitive disadvantage.

He stated that if p.c. concrete contractors were required to bid eight inches of portland cement concrete and four inches of sand against a six-inch stone base and six inches of asphaltic concrete they could not compete and that if it would continue all the way through the job to leave them out. He felt that the plan proposed would lead people to believe that there was going to be competition when he knew there would not be. It was his contention that a design should be adopted by which p.c. concrete contractors, by hard bidding, would have a chance of getting part of the work.

Quoting further from Mr. Bailey's report: "After the hearing on March 20, 1951, the Turnpike Authority in-

## Legislators Were the Locating Engineers

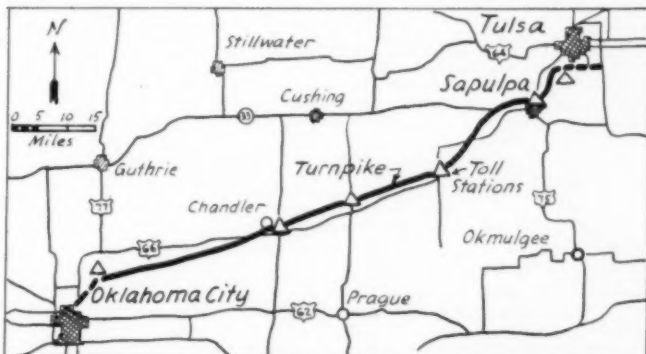
According to the law which established the Oklahoma Turnpike Authority, the Authority is empowered "... to construct, maintain, repair, and operate a turnpike project and highway which with its access road construction and connections shall extend between the cities of Tulsa and Oklahoma City along such a route as will not be a greater distance than approximately one-half ( $\frac{1}{2}$ ) mile from the city limits of the following cities and towns: Sapulpa, Bristow, Stroud, and Chandler; and in passing through or in proximity to such named towns and cities such road shall be located as nearly as possible and practicable along and upon the new proposed survey and location of Highway 66, as now appears in the office of the State Highway Engineer and it shall be the duty of such Authority to construct, with entrances, a suitable and adequate access road, to be approved by the

Highway Commission of the State of Oklahoma, connecting such turnpike with the principal business district of each of said named towns and cities ..."

From this it is seen that the Authority was closely confined to a previously planned relocation for Highway U.S. 66 as the plan had developed at the time of the passage of the Act (SB225, 1947 Session Laws and HB197, 1949 Session Laws with Sections 2 and 9 amended). The quotation above is taken from Section 3e.

The restriction on location naturally brought up many complications, the last major one of which will probably have been settled before this story goes to press.

It is the writer's plan to discuss what he believes to be the principal feature of the job from a technical point of view and to let the tables, drawings and pictures included herewith tell the design story.



★ Turner Turnpike was routed closely parallel to U.S. 66 and located to skirt principal cities enroute



★ County road, Lincoln County,  $\frac{1}{2}$  mi. north of U. S. 66, after rain

### Design Directive Data

Design axle load, 24,000 lb. + 20% impact	28,800 lb.
(Oklahoma legal axle load limit, 18,000 lb.)	
Maximum gradient	3%
Minimum gradient	0.3%
Design speed	70 m.p.h.
Min. sight distance, vertical curves	700 ft.
Height of eye over surface	4½ ft.
Height of object on surface	4 in.
PC-PT sag verticals	
Max.	1,000 ft.
Min.	400 ft.
Horizontal curves	Not over 3 deg.
Max. curve on project	1°30'
Min. sight distance	700 ft.
Minimum length profile tangent	500 ft.
Minimum right of way width	200 ft.
Minimum vertical clearances	15 ft.
Minimum free board, box or pipe	4 ft.
Maximum curvature on interchange roads	250 ft. radius
All curves on interchange roads with acceleration and deceleration lanes	Spiraled
Waterway opening sizes guided by Talbot's formula and tables worked up therefrom giving due consideration to local conditions.	
Fills compacted to % of Standard Proctor	90%
Select material compacted to % of Proctor	95%
Minimum lane width, Turnpike	12 ft.
Minimum lane width, interchange roads	12 ft.
Turnpike bridge design loading	AASHO, H20-S16
Cross road bridge design loading	
U.S. 66	AASHO, H20-S16
State roads	H20
Local roads	H15
All bridges minimum width	18 ft.
Minimum fill height requiring guard rail	10 ft.
Pavement transverse slope	½ in. per ft.
Super-elevation	70 mph



★ Exhibit showing cross-section of pavement design adopted for the turnpike

### Exhibit No. 3

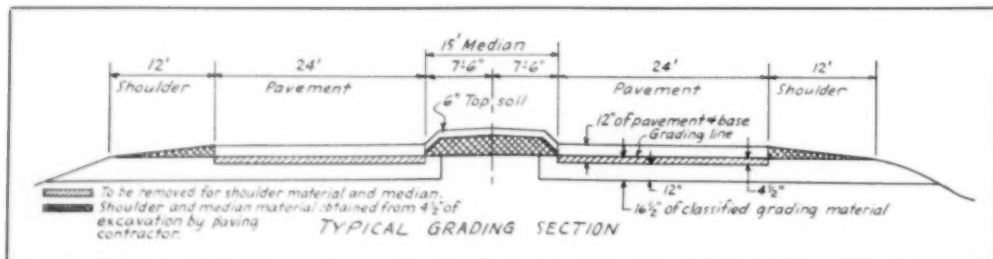
Table 1—Tabulation of Theoretical Load Capacity of Turner Turnpike Base and Paving Sections

Method Number	Designation	Alternate Number	Type of Paving	Paving Thickness Inches	Base Thickness Inches	Theoretical Load Capacity
1	Westergaard Formulae	1	P. C. Concrete	8	4	15,100
		2	P. C. Concrete	9	3	14,500
2	Sheet's Formulae	1	P. C. Concrete	8	4	15,600
		2	P. C. Concrete	9	3	15,700
3	O. J. Porter Curves (California Bearing Ratio)	3	Asphaltic Concrete	5	7	15,000
		4	Asphaltic Concrete	6	6	15,000
4	O. J. Porter Curves modified by D. M. Burmister's Equation	4	Asphaltic Concrete	6	6	22,000
		5	Asphaltic Concrete	8	4	24,500
5	Kansas Method—Single Tire Load	3	Asphaltic Concrete	5	7	14,700
		4	Asphaltic Concrete	6	6	15,000
6	McLeod's Curves	3	Asphaltic Concrete	5	7	16,000
		4	Asphaltic Concrete	6	6	16,500
		5	Asphaltic Concrete	8	4	17,500

### Average Bid Prices

(Feb. 8, 1952)

Roadway excavation,	
unclassified	\$ 0.30/cy.
Borrow	0.29/cy.
Structure concrete, culverts	34.50/cy.
Foundation concrete, piers,	
abutments, etc.	44.10/cy.
Deck concrete (7 sack)	45.02/cy.
Paving	
Base	1.30/sy.
1st course bit. conc.	1.16/sy.
Top course bit. conc.	0.74/sy.
P.C. conc.	4.27/sy.
Surface treatment	0.12/sy.
Prime coat	0.06/sy.
Preparing subgrade	0.04/sy.
Watering and compacting	0.05/cy.
Fencing	0.26/lin. ft.
Guard rail (metal plate)	1.97/lin. ft.
Structural steel, in place	0.15/lb.
Reinforcing steel, in place	0.15/lb.
Subdrainage	3.50/ft.
Grassing	
Tufting	0.05/sy.
Slab sodding	1.20/sy.





## Information on Design Methods Used in Selecting Pavement for Turner Turnpike

### Exhibit No. 3B

#### Method No. 1—Westergaard Formulae

**Origin.** Based on equations developed by H. M. Westergaard, Dean, Graduate School of Engineering, Harvard University. Taken from P. C. A. Pamphlet, "Concrete Pavement Design."

#### Necessary Design Criteria and Assumptions

1. Used 350 lbs. per square inch as allowable stress in extreme outer fiber of concrete (Safety Factor of 2).
2. Used Subgrade Modulus "K" of 200 (Corresponds to 10 CBR in top portion of subgrade).
3. Used curves for protected corners (Fig. 17 in pamphlet) for alternate No. 1 (8" concrete and 4" sand cushion).
4. Used curves for unprotected corners (Fig. 26 in pamphlet) for alternate No. 2 (9" concrete and 3" sand cushion).

**Remarks.** This design method is applicable to dual wheel loads.

#### Method No. 2—Sheets Formulae

**Origin.** Based on equations developed by Frank T. Sheets, President of the Portland Cement Association. Taken from P.C.A. Pamphlet, "Concrete Pavement Design."

#### Necessary Design Criteria and Assumptions

1. Used 350 lbs. per square inch as allowable stress in extreme outer fiber of concrete (Safety Factor of 2).
2. Used "C" of 0.9 corresponding to Subgrade Modulus "K" of 200.
3. Used curves for protected corners (Fig. 17 in pamphlet) for alternate No. 1 (8" concrete and 4" sand cushion).
4. Used curves for unprotected corners (Fig. 26 in pamphlet) for alternate No. 2 (9" concrete and 3" sand cushion).

#### Method No. 3—O. J. Porter Curves (California Bearing Ratio)

**Origin.** Curves were developed by Mr. O. J. Porter while he was with the California Division of Highways. See Highway Research Board Proceedings for 1942, Vol. 22, page 116. Curves were cross-plotted to give wheel load of 12" thickness.

#### Necessary Design Criteria and Assumptions

1. Thickness of granular base plus pavement was obtained direct from a

curve using California Bearing Ratio of 10, which is the minimum allowable from the top portion of the subgrade.

**Remarks.** This is generally recognized as a very conservative method. For instance, the U.S. Engineers employ these curves for single tire loads with 100 lbs. per square inch pressure. Also, no distinction is made between selected base material and asphalt paving.

### Exhibit No. 3C

#### Method No. 4—O. J. Porter Curves (D. M. Burmister's Equation)

**Origin.** Based on equations developed by D. M. Burmister in conjunction with design of airport runways reported in Highway Research Board Proceedings for 1943, Vol. 23, page 126.

#### Explanation

Burmister was the first authority to present a method whereby a given thickness of base could be translated to an equivalent thickness of pavement, or vice versa. His derivation was based entirely on elastic theory, which appears to be valid for high type pavements and bases because they are seldom stressed beyond the elastic limit. A little thought will reveal that practically all the deformation and the failure of a high type flexible road occurs in the subgrade and subbase portions.

The equation employs the modulus of deformation of the respective materials. The modulus of deformation is actually nothing more than the modulus of elasticity as applied to steel and other highly elastic materials. When applied to highway materials the authorities have chosen to term it the modulus of deformation instead of modulus of elasticity.

The equation follows:

$$T_p = T_b \sqrt[3]{\frac{C_b}{C_p}}$$

Where

$T_p$  is the thickness of pavement in inches.

$T_b$  is the thickness of base in inches.

$C_p$  is modulus of deformation of pavement in pounds per square inch per inch.

$C_b$  is modulus of deformation of base in pounds per square inch per inch.

#### Necessary Design Criteria and Assumptions

$$C_p = 25,000$$

$$C_b = 10,000$$

**Remarks.** These values are those used by the Kansas Highway Department, who employ Burmister's Equation as part of their analysis in designing the thickness of pavement and base.

### Exhibit No. 3D

#### Method No. 5—Kansas Tri-Axial Analysis

**Origin.** Developed by personnel of the Kansas State Highway Department and others. Notably, Mr. Herbert E. Worley, Laboratory Research Engineer, Kansas Highway Department; Mr. E. S. Barber, Highway Engineer, Bureau of Public Roads; and Mr. L. A. Palmer, Principal Engineer Soil Mechanics, Bureau of Yard & Docks, U. S. Navy.

#### Necessary Design Criteria and Assumptions

1. Moduli of deformation as follows were used in making calculations:

- a. Subgrade, 5,500.
- b. Stabilized Aggregate Base, 10,000.
- c. Asphaltic Concrete, 25,000.

Due to the fact that the Kansas Curves for dual-wheel loads do not extend above 9,000 lbs., it was necessary to use their equation for single-wheel loads, resulting in a much more conservative theoretical load capacity than would have been obtained from the curves for dual-wheels. For 9,000 lb. wheel loads, about one-third more thickness is required for single-wheel loads than the dual type.

**Reference:** Highway Research Board Bulletin No. 8, "Design of Flexible Pavements Using the Tri-Axial Compression Tests."

#### Method No. 6—McLeod's Curves

**Origin.** Based on Curves developed by Norman W. McLeod, Figure 3 of "An Introduction to the Design and Construction of Asphalt Pavements."

#### Necessary Design Criteria and Assumptions

1. Average Field CBR of top 18" of subgrade = 10.5
2. Base to pavement ratio = 1.5

**Remarks.** Dr. McLeod was awarded the Highway Research Board Award for his paper in which the original version of these curves was presented.

# Exhibit No. 2—Analysis of Cost of 6" Controlled Subgrade Material—Oklahoma Turnpike

Contract Number	Length of Contract Miles	Backfill Excavation Per C.Y.	Amount per mile	Per C.Y.	Borrow Amount per mile	Increase or Decrease in Cost per Mile if Borrow	Increase or Decrease per S. Y.	Total Increase or Decrease for Contract	Blending 6" Thick Cost per Sta.	Cost of Blending per S. Y.	Total Cost of Blending for Contract	Total Increase or Decrease for Contract
1	4.545	.39	3062.40	.30	3168.00	+ 105.60	-.0021	+ 479.95	---	---	---	+ 479.95
2	4.427	.355	2692.80	.15	1584.00	- 1108.80	-.0217	- 4908.66	---	---	---	- 4908.66
3	3.337	.245	2587.20	.29	3062.40	+ 475.20	+.0093	+ 1585.74	---	---	---	+ 1585.74
6	4.188	.28	2956.80	.27	2851.20	- 105.60	-.0021	- 442.25	110	30.00	.0310	+ 3300.00
7	3.787	.23	2428.80	.28	2956.80	+ 528.00	+.0103	+ 1999.54	99	35.00	.0362	+ 3465.00
8	4.429	.30	3168.00	.25	2640.00	- 528.00	-.0103	- 2333.76	---	---	---	- 2333.76
9-A	3.081	.40	4224.00	.40	4224.00	---	---	---	---	---	---	---
9-B	3.233	.33	3484.80	.26	2745.60	- 739.20	-.0145	- 2389.83	---	---	---	- 2389.83
11-A	2.463	.46	4857.60	.15	1584.00	- 3273.60	-.0641	- 8062.88	---	---	---	- 8062.88
11-B	2.560	.40	4224.00	.15	1584.00	- 2640.00	-.0517	- 6758.40	---	---	---	- 6758.40
12	2.840	.39	3168.00	.40	4224.00	+ 1056.00	+.0207	+ 2999.04	---	---	---	+ 2999.04
14	5.996	.21	2217.60	.22	2323.20	+ 105.60	+.0021	+ 633.18	---	---	---	+ 633.18
15	3.982	.26	2745.60	---	---	---	---	---	210	30.00	.0310	+ 6300.00
16	3.388	.30	3168.00	.30	3168.00	---	---	---	---	---	---	---
19	2.827	.20	2112.00	.20	2112.00	---	---	---	---	---	---	---
20	2.115	.20	2112.00	.20	2112.00	---	---	---	---	---	---	---
21	3.605	.35	3696.00	.20	2112.00	- 1584.00	-.0310	- 5789.52	---	---	---	- 5789.52
22	3.879	.27	2851.20	.22	2323.20	- 528.00	-.0103	- 2948.11	---	---	---	- 2948.11
23	3.470	.23	2428.80	.23	2428.80	---	---	---	---	---	---	---
25	3.098	.30	3168.00	.30	3168.00	---	---	---	---	---	---	---
26	2.593	.27	2851.20	.27	2851.20	---	---	---	---	---	---	---
27	2.970	.35	3696.00	.30	3168.00	- 528.00	-.0103	- 1568.16	---	---	---	- 1568.16
28	1.996	.35	3696.00	.30	3168.00	- 528.00	-.0103	- 1053.89	---	---	---	- 1053.89
Total Decrease in Cost using Borrow						-35,355.46		-				
Total Increase in Cost using Borrow						+7,697.45		+				
Net Decrease in Cost using Borrow						-27,658.01		+				
78.840								+13,065.00				
								-14,593.01				

Cost per mile based on 10,560 C. Y. of controlled subgrade per mile; cost per S. Y. based on 51,040 S. Y. per mile; cost per S. Y. based on 966.67 S. Y. per station.

-Figure means decrease in Cost.  
+Figure means increase in Cost.

## Plan Notes for Grading Section on Fill

Note: The grading procedure in both cuts and fills shall be as follows:

Case I—If material having a C.B.R. of 5 or less and a P.I. of more than 20 is encountered at template grade in cuts, it shall be removed to a depth of 12 inches below template grade. No such material shall be placed higher than 12 inches below template grade in fills. The roadbed from 12 inches below template grade to template grade shall be built up with materials having a C.B.R. of 6 or more and a P.I. of less than 20, from template grade to 6 inches above template grade with materials having a C.B.R. of 8 or more and a P.I. of less than 10, and from 6 inches above template grade to the grading line with Special Subgrade Materials. Case II—If the material at template grade to a depth of more than 12 inches below template grade has a C.B.R. of 6 to

7 and a P.I. of 10 to 20, the roadbed shall be built up to 6 inches above template grade with materials having a C.B.R. of 8 or more and a P.I. of less than 10 and from 6 inches above template grade to the grading line with Special Subgrade Materials.

Case III—If the material at template grade to a depth of more than 6 inches below template grade has a C.B.R. of 8 or more, and a P.I. of less than 10, the roadbed shall be built up from template grade to 6 inches above template grade with materials which are equal to or better than the materials of template grade and from 6 inches above template grade to the grading line with Special Subgrade Materials. Special Subgrade Materials shall conform to the requirements of the Special Provisions of the Specifications.

paving designs, two alternate designs on portland cement concrete and three alternate designs on asphaltic concrete on a flexible base. All five alternate designs were predicated on a minimum axle load of 28,800 lb. for which the paving is being designed."

"\*\*\*\*\* I feel that it is important at this time to furnish you as briefly as possible design data developed in connection with the five alternate designs previously approved by you. Therefore, I am attaching a statement marked Table No. I, Table No. II, and Table No. III with supporting information and identified as Exhibit No. 3. This Exhibit is submitted at this time in order that you may have before you complete information on nationally recognized and accepted engineering pavement designs. Note from Exhibit No. 3 that in no case on any of the five alternate designs does the wheel load fall below the design criteria of 14,400 lb."

To further show the value of the two 6-in. sub-base courses of selected materials, and to show that their inclusion in the design for both types of surfaces does not adversely affect the portland cement concrete position, the following excerpts were taken from this same report:

"As of this date the Turnpike Authority has under actual contract a total of 78.840 miles of grading and drainage and from an analysis of the actual contract unit bid prices I have prepared a statement (Exhibit 2) that will give you a complete record

(Continued on page 56)

## Exhibit No. 3A

Table II—Comparison of Theoretical Wheel Load Capacities

By Two Design Methods for Portland Cement Concrete Pavements

Alternate Number	Pavement Base Inches	Westergaard Formulae Pounds	Sheet's Formulae Pounds
1	8-4	15,100	15,600
2	9-3	14,500	15,700

Table III—Comparison of Theoretical Wheel Load Capacities

By Various Design Methods for Asphaltic Concrete Pavements

Alternate Number	Pavement Base Inches	O. J. Porter Curves Pounds	O. J. Porter-Burmister Pounds	Kansas Method Single Tire Pounds	McLeod's Curves Pounds
3	5-7	15,000	21,000	14,700	16,000
4	6-6	15,000	22,000	15,000	16,500
5	8-4	15,000	24,500	15,800	17,500

structed the consulting engineers, DeLew, Cather and Company, to bring up plans and specifications for both types of asphalt and portland cement pavement and prepare estimates for

those two and see if they are in competitive range, \* \* \*. As a result of this action DeLew, Cather and Company submitted for the Authority's consideration \* \* \* five alternate

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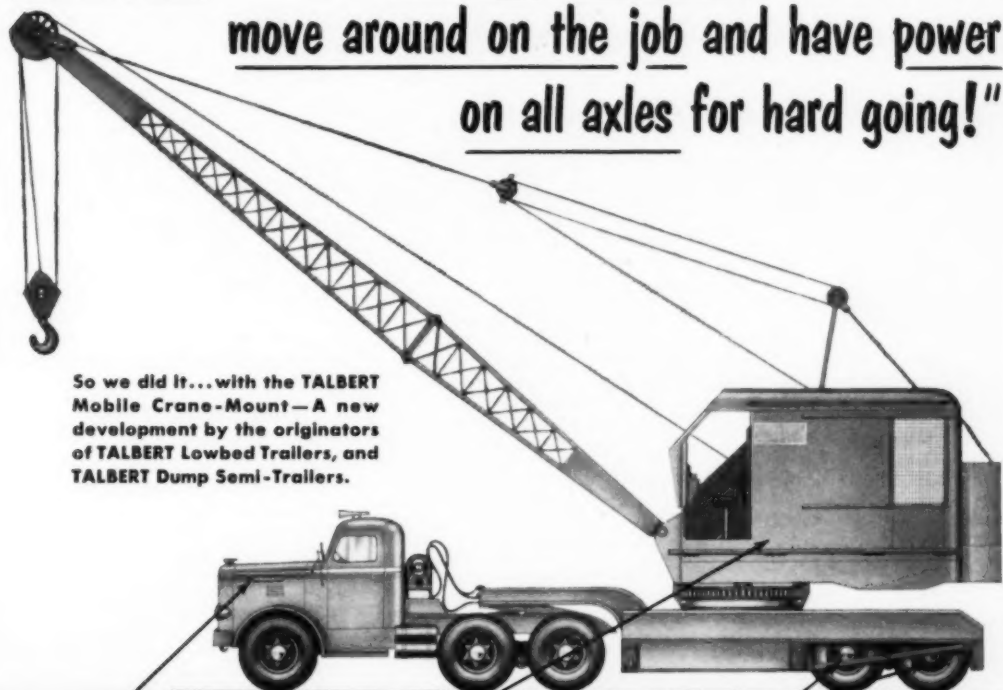
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move around on the job and have power  
on all axles for hard going!"**



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(Continued from page 52)

of the total cost in place of the additional six inches of selected sub-grade material which caused so much controversy."

"You will note from Exhibit No. 2, each contract is analyzed individually and where the cost was more, the amount is indicated by a plus sign, where the cost was less the amount is indicated by a minus sign. \* \* \* \* \*"

"On three grading contracts, in order to meet the approved specifications, it will be necessary to blend materials and on these contracts we have recognized the cost of manipulation amounting to a total of \$13,065.00 in order to meet the specifications. Therefore, after taking everything into consideration it has actually cost the Turnpike Authority \$14,593.01 less to secure in place the additional controversial six inches of selective sub-grade materials on a total of 78,840 miles than it would have cost had we completely ignored selective sub-grade treatment and just placed the excavated materials as they came out of the cut sections and dumped the material into the fill sections without regard to the type of soil. \* \* \* \* \*"

As a result of these studies made for the Turnpike Authority, bids are taken on all five types of competitive surfacings. As stated in the beginning, to date the low bids have been for bituminous concrete and of the three bituminous types, the low bid has been for the 5 in. of hot-mix hot-laid bituminous concrete on 7 in. of high type crushed stone base. An accompanying picture shows the various surfacing thickness, the 5 in. being broken down into two courses.

A comparison of costs and values of savings in initial investment on paving lettings to December 20, 1951, was

made to show how much would be available for maintenance of bituminous concrete when used instead of portland cement concrete. The accompanying table shows a calculation made by Turnpike Authority engineers in justification of selection of bituminous concrete surfacing.

Referring back to Exhibit No. 2, it may seem odd, and in fact it is an odd situation, that the Turnpike Authority actually saves money by doing more work, i.e., hauling from cut to fill, and blending where necessary. This comes about, of course, because of unbalanced bidding. The figures, however, prove a point for the Turnpike Authority, and that is, that the controversial 6 in. of selected material actually saved money and yet gave a better base for any type of pavement.

The following paragraph taken from Mr. Bailey's report from which the writer has been quoting is significant:

#### Future of Surfacing

"There has been considerable conversation from various sources indicating that it is the duty and responsibility of this Turnpike Authority to select a type of pavement that will last and remain in good condition over a period of forty years, the life of the bonds. Possibly this could be done if you had several extra millions of dollars to spend on paving and knew exactly what type of traffic that this road will be carrying in the next ten, twenty, thirty and forty years. But obviously this would be a very unwise and uneconomical approach to this matter as regardless of the type of pavement that is finally selected you will have maintenance expenses from the day it is opened to traffic and if automotive traffic continues to develop in the future as it has in the past ten

years, and I think it will, and I think it is the duty of all the states, as well as the Federal Government, to design accordingly and prepare for it, as this modern type of traffic is necessary to our future existence.

"I think it is pretty well understood at this time from a national basis that had the several states and the Federal Government kept pace with building and modernizing of the National Highway System that toll roads would not be coming back into existence as they are today. Therefore, I make this observation, for what it might be worth to you, that the design axle load previously approved by you for the Oklahoma Turnpike is the very minimum that should be considered and that any extra that can be worked into this on a reasonable financial basis should be done without fail, as I think that within the next ten to fifteen years we will all be criticized for not designing this project for an axle load of 36,000 lb. or more. When this time arrives the Authority will be faced with the complete half-soleing of this pavement whether you use portland cement concrete or asphaltic concrete and I would wager that this period will arrive long before the last of the forty year bonds are paid off."

#### Traffic Survey Plan for Chicago

The Chicago city council has proved the making of a traffic survey for Chicago and environs, authorizing the Chicago Public Safety Committee to co-operate with Federal, county and state officials in working out the study which will cost about \$1,000,000.

A permanent steering committee to push plans for the survey has been appointed by J. J. Cavanagh of the Chicago Motor Club. This committee includes Frank Barker, Chief Highway Engineer of Illinois, as general chairman. Federal, state and county funds are sought for this co-operative study.

#### Highway Departments Find Big Scrap Tonnage

Scrap metal rounded up in the scrap drive totalled 65,415 tons from 35 state highway departments and the U.S. Park Service for the first quarter, according to a memorandum from the Bureau of Public Roads. Probably the ferrous recovery drive will exceed 100,000 tons when all states are heard from. New York was first with 7,043 tons, Texas second with 4,014 tons, Florida third with 3,446 tons, Massachusetts fourth with 3,369 tons.

#### Analysis of Bid Prices vs. Maintenance

Total of low p. c. concrete bids received at letting	\$10,452,484.10
Total low asphaltic concrete bids received at letting	9,291,364.43

Difference representing savings in initial investment by using asphaltic concrete on 82,579 miles \$ 1,161,119.67

a. If this savings in initial investment is considered without interest, a total of \$1,161,119.67 would be available during the next 40 years for maintenance.

Available each year for 40 years is  $\frac{\$1,161,119.67}{40} = \$ 29,027.99$

Available per mile each year = \$351.52 for maintenance for 40 years by using asphaltic concrete paving.

b. If this initial saving of \$1,161,119.67 was invested at 3½% interest (which is the average interest rate on the Turnpike Bonds), both the initial investment savings and the interest would be available during the next 40 years for maintenance.

Available from interest each year \$ 40,639.19

or \$492.12 per mile each year for 40 years

Average available per year for 40 years from savings in initial investment \$ 29,027.99

or \$351.52 per mile per year for 40 years \$ 69,667.18

Total or \$843.64 available for maintenance per mile per year for 40 years by using asphaltic concrete paving



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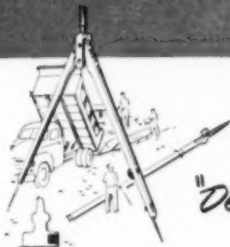
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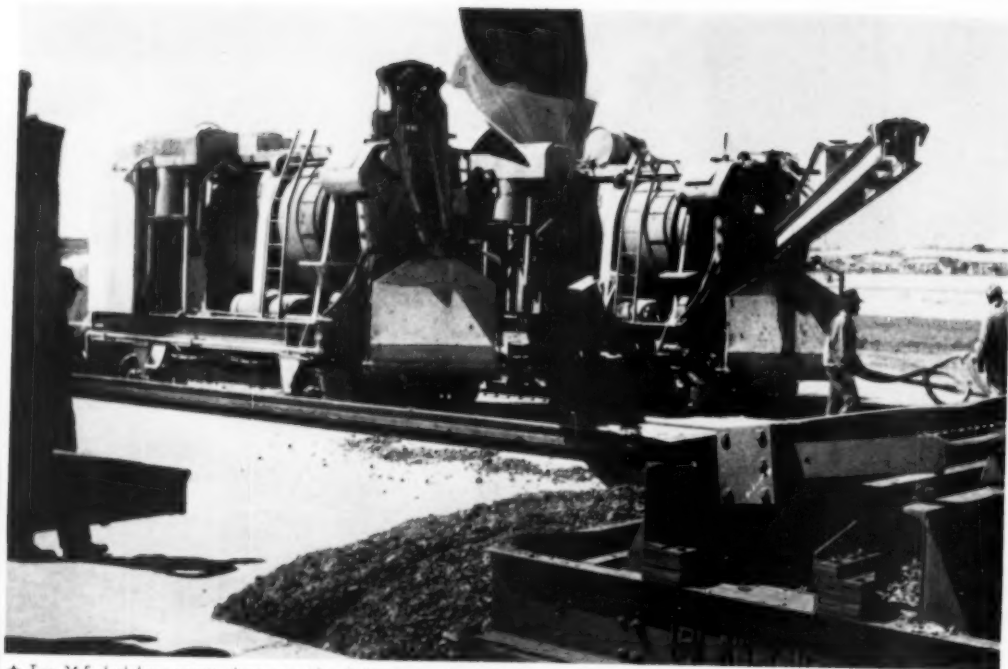


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★ Two 34-E dual-drum pavers along one side of the pouring lane—scheme preferred by both contractors at Lake Charles Air Base

## HOW CONTRACTORS ARE PLACING 429,000 CU. YD. OF CONCRETE AT

# Lake Charles Air Force Base

ONE of numerous military airfields undergoing transformation today is Lake Charles Air Force Base at Lake Charles, Louisiana. This training base of the Strategic Air Command was built in 1942, and saw heavy service throughout the war. The same contracting organization which placed extensive concrete pavement at that time now has the modernization; T. L. James and Company, of Ruston, Louisiana, holds a \$7,985,000 competitive-bid contract awarded June 30, 1951.

The Corps of Engineers, Galveston

District, has charge of the job under a general airbase modernization program for which F. Shutts' Sons, consulting engineer at Lake Charles, did only the design. T. L. James and Company has subcontracted part of the work to W. R. Aldrich and Company, of Baton Rouge, the two contractors dividing up the work.

The contract includes runways, taxiways and apron extensions or overlays of portland cement concrete totaling about 936,000 sq. yd., making this one of the largest concrete paving

jobs currently under way in the U.S. The job consists mainly of the following elements:

1. A runway 10,000 x 200 ft. with the central 8,000-ft. paved 16 in. thick and the 1,000 ft. end zones 17 in. thick. A 1,000 ft. turfed over-run zone at either end, using native soil compacted to 90% density (modified AASHO), with the top 4 in. left uncompacted for later turfing. Shoulders 200 ft. wide are compacted to 95% for the first 10 ft. out from the pavement, and 90% thereafter, with the top 4 in. uncompacted for later turfing.

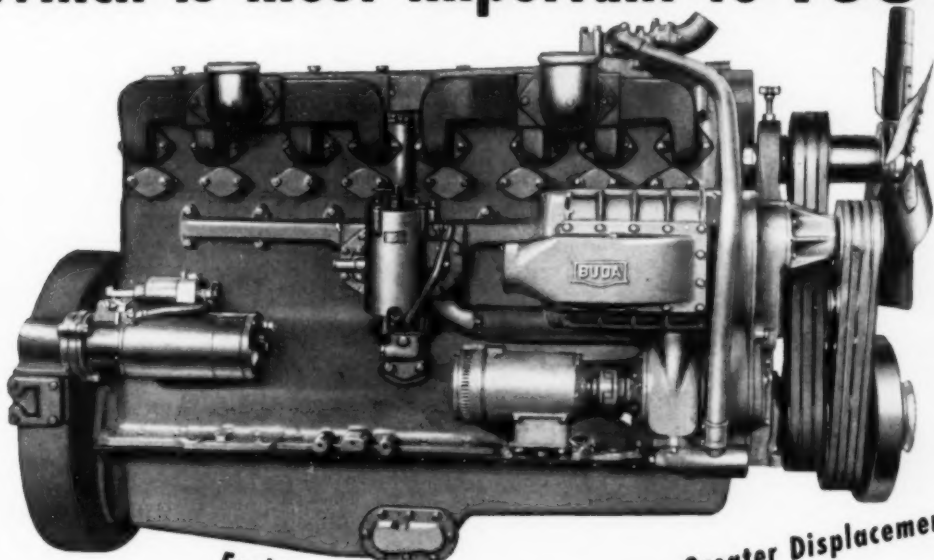
2. A parallel taxiway 10,000 x 75 ft. paved 17 in. thick throughout, with 50 ft. compacted earth shoulders.

3. An apron, 1,075 x 4,340 ft. consisting of 13 in. thick overlay over old concrete and 17 in. concrete over soil subgrade.

### Modernizing Wartime Airbases—3rd in a Series

*Design features and construction methods for project which involves placing 936,000 sq. yd. of 16 and 17 in. concrete on native soil subgrade and 13 in. concrete-on-concrete overlay.*

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★ (Upper Scene): Drilling holes through the existing concrete apron for form pins, in preparation for placing 13 in. overlay slab. Completed lane of overlay seen at right. (Lower Scene): The old apron pavement was kept clean during paving operations by use of a sweeper and a grader

4. A quantity of pavement of variable depth for transitions, roadways, etc.

#### Site Conditions and Grading Methods

The field is located about 40 miles from the Gulf Coast, and near the Calcasieu River, occupying terrain which despite its flatness and low elevation (17 ft. above mean sea level) has a relatively low water table. Water was encountered 10 to 12 ft. below ground during most of 1951, rising in the past winter to about 4 ft. below the surface. The surface soil is largely a silty loam, turning to clay loam, then to heavier clay of higher bearing value at varying depths, usually within 1.5 to 4 ft. of the surface. At some points, however, as much as 12 ft. or more of organic soil exists at the site of old

60

★ On the Lake Charles job: W. J. Griggs, asst. resident engineer; O. T. Hodges, concrete engineer; J. C. Perrellt, project manager for T. L. James & Co.; Res

irrigation canals once used for rice farming or from area drainage during war years.

These are some of the conditions found by the Corps of Engineers staff in investigating this site to determine upon the pavement design. The original pavement, consisting of 8-6-8 in. reinforced concrete, had in the main stood up very well on the native soil subgrade, although some pumping at joints had developed. As a result of numerous theoretical studies and accelerated traffic tests, the engineers developed a concrete design for today's much heavier planes and jet fuels. Again the native soil is to be used as the subgrade in the absence of higher grade borrow. However, 95% density is specified for the first 13 in. of depth and 90% on down to hard, stiff clay locally called "hardpan," as determined by the mod-

#### Principal Quantities

460,000 c.y. excavation
430,000 c.y. embank. (subgrade and base)
75,000 c.y. borrow
8,000 l.f. storm dr. removal (12" to 42")
7,700 l.f. storm drains (24" to 48")
140,000 s.y. conc. pave. removal
198,670 s.y. conc. pave. overlay (13")
188,890 s.y. conc. pave. (16")
548,880 s.y. conc. pave. (16")
460,000 s.y. mulching
175 acres seeding
200,000 l.f. elec. cable in duct

ified AASHTO test methods. The new pavement is designed for a loading of 100,000 lb. on dual wheels spaced 37.5 in. c.c.

The contract includes only unclassified excavation, and no limitation was placed on the method by which the contractor should obtain the required density of subgrade. This meant that the contractor had to be selective in the soil placed or retained under pavement areas, and that some organic soil had to be wasted.

Only minor leveling of the field was required, the principal excavation yardage being that involved in excavating and replacing subgrade materials. In general, the procedure was to open up a strip about 50 ft. wide with scrapers, going down until material was encountered that tested 90% in place or until "hardpan" was reached. Then suitable material from adjacent working strips was used to backfill in 6 in. compacted thickness lifts.

Various sizes and weights of sheep-foot rollers were used, and medium-light pneumatic rollers were used effectively at times. A 50-ton rubber tired compactor, placed on the project experimentally, did not prove successful because of insufficient foundation support; there was a tendency for ground water to pump up under the machine after one or more passages and its use was abandoned.

The principal drainage problem for the field was that of handling surface

Pinkley, resident engineer; Stacy McKnight, soils engineer  
★ Accident-prevention activities under direction of the Corps of Engineers were intensified by rivalry between contractor crews







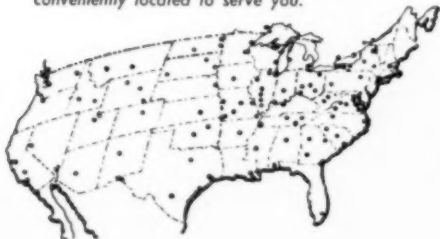
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**Heavy-duty 4-speed transmission** allows desired rolling speed at full engine power. Two-speed transmission (optional) can be converted easily to 4-speed transmission with purchase of another set of gears and shifter.

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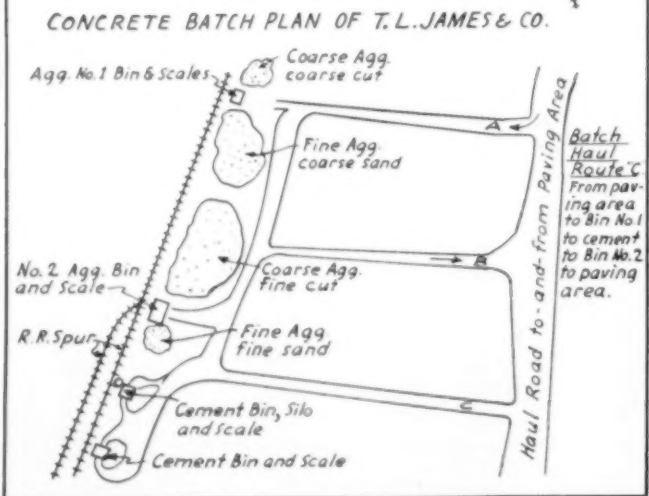
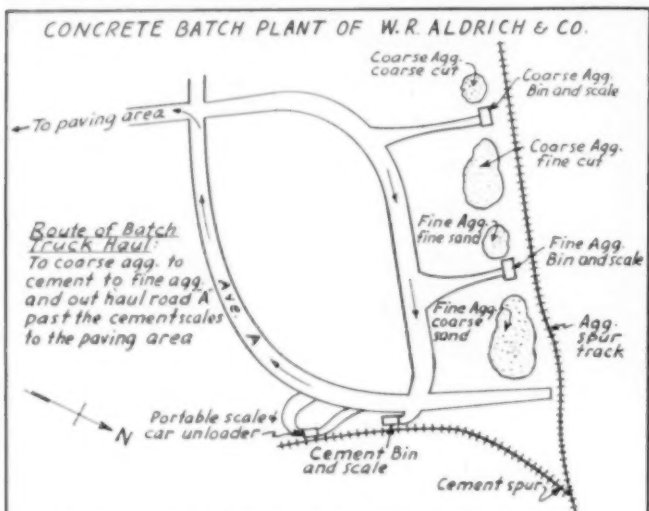


★ (Left): The two cement docks of T. L. James & Co.—see layout sketch. (Right): Looking along the stockpiles of T. L. James; aggregate batchers seen in foreground and background; rail spur behind crane at left

runoffs, since the field is quite flat and heavy rains are frequently encountered in this Gulf Coast area. Replacement of some existing drains with

large diameter pipe and extension of storm drains totaling about 7,000 ft. of extra strength reinforced concrete pipe up to 48 in. diameter, were in-

cluded in the contract. No sub-drains or French drains are used. The runway is designed with a  $1\frac{1}{2}\%$  transverse slope from the centerline.



★ Both contractors laid out their concrete batch plants for fast loading and high speed production

### Concrete Design

Concrete pavement, placement of which is in progress, is designed with 25-ft. lanes, keyed but without tie bars. Transverse dummy groove joints are spaced at 25-ft. intervals, this spacing being varied at times in the overlay slabs to make new joints conform in position with joints in the underlying old pavement. Expansion space is provided only at intersections or around utility openings. No steel of any kind is included in the pavement except at infrequent joints, where  $1 \times 20$  in. dowels on 18 in. ctrs. are required, and at transverse construction joints, where tie bars are used.

Dummy joints and expansion joints are to be sealed with thermo-plastic rubber asphalt compound, with jet fuel resistant type of compound specified for aprons, taxiways and at other points where exposure to fuel spillage is anticipated.

The concrete is a 5-sack mix designed for 650 psi. flexural strength at 28 days. Two gravel course aggregate sizes and two sand sizes are being used, a fine blow sand being added to one sand source in order to meet gradation requirements. All aggregates are brought in by rail. Air entraining concrete is being used; the contractor is adding an air entraining agent at the pavers to provide 2% air.

The contractor and subcontractor each have a complete paving outfit on the project which includes two 34-E dual drum pavers and a 34-E standby; one oscillating screed spreader; a bridge-mounted vibrating unit; one transverse finisher (and in one outfit a mechanical longitudinal float finisher); and a complete batch plant. It is to be noted that for 16 and 17 in. pavement depths, two pavers are required to get full work out of one spreader and one finisher in a balanced operation.

### Vibrating Equipment

Each contractor in general has

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## Fact No. 3

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## Fact No. 4

### KEEPS ITS VALUE LONGER

Chevrolet trucks traditionally keep their value longer to bring higher used truck prices, year after year, at trade-in time. That means real, substantial dollar-and-cents savings when you wish to replace your present truck with a new one.

## CHEVROLET ADVANCE-DESIGN TRUCK FEATURES

TWO GREAT VALVE-IN-HEAD ENGINES—Loadmaster or the Thriftmaster—to give you greater power per gallon, lower cost per load • POWER-JET CARBU-RATOR—for smooth, quick acceleration response • DIAPHRAGM SPRING CLUTCH—for easy-action engagement • SYNCHRO-MESH TRANSMISSION—for fast, smooth

shifting • HYPOID REAR AXLE—for dependability and long life • TORQUE-ACTION BRAKES—on light-duty models • PROVED DEPENDABLE DOUBLE-ARTICULATED BRAKES—on medium-duty models • TWIN-ACTION REAR BRAKES—on heavy-duty models • DUAL-SHOE PARKING BRAKE—for greater holding ability on heavy-

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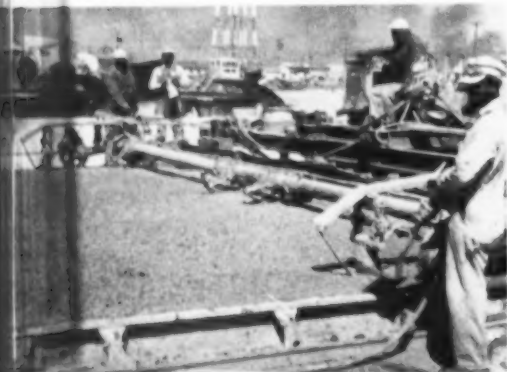
When writing advertisers please mention **ROADS AND STREETS**, June, 1952



★ The two cement docks of W. R. Aldrich & Co.—both equipped with twin hoppers for speedy loading (see tabulation for equipment details)



★ Large capacity tank trailers for paver water were employed by both contractors. Aldrich (left) converted an obsolete earth rig into a tank. James (right) used a standard trailer tank, supplied by shop-built tankers used also as grade sprinklers

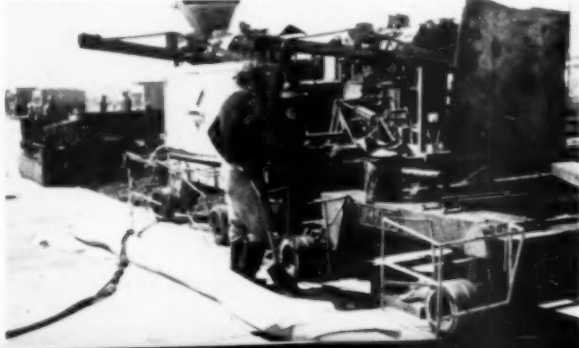


★ At left the Jackson vibrating unit employed by W. R. Aldrich for internal vibration of pavement, and at right is truck-mounted power plant. This unit, as with James' unit, traveled between the spreader and the transverse finisher



64

★ (Left Below): Jeep-mounted compressor used by Aldrich to keep bulk cement moving through the plant. (Right Below): Special rubber-tired wheels devised by Aldrich for one side of the spreader, vibrator bridge and finisher. Note also tubular guard frames around wheels as a safety measure





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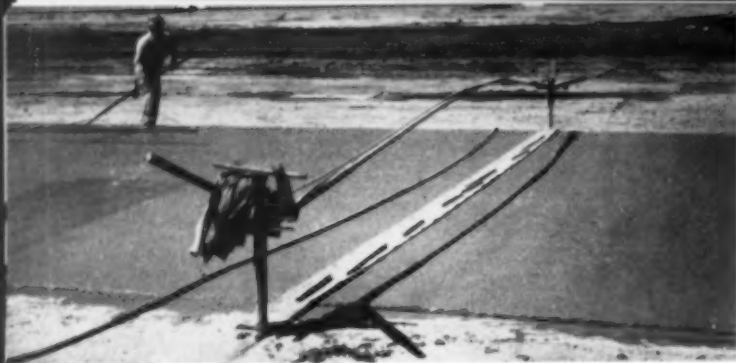
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rugged jobs—there's a Dodge truck engineered at the factory to fit the job, save you money, last longer. For example, a Dodge "Job-Rated" 2½-ton model has a powerful 114-h.p. engine—plus the extra maneuverability made possible by short turning diameter . . . the added dependability assured by moistureproof ignition . . . and many other outstanding advantages.

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# DODGE "Job-Rated" TRUCKS





★ Hand finishing steps included use of long-handled lute, long-handled wood float, hose drag, belt, edger, brush along edges and joints (shown). Sprung tubular frame (shown at right) was a handy device for keeping belt tensioned to minimize sag



worked with both pavers on one side of the pouring lane, this method being preferred to that of having a paver on each side, due to simplified batch and water delivery. Also at times only in the overlay the pavers have been tied closely together and operated side-by-side between the forms in a synchronized mixing and dumping cycle.

A vibrating unit traveling between the spreader and the finisher is mounted on an old finishing machine, whose sole function is to serve as a traveling bridge. James employs a Viber unit consisting of a battery of vibrating tubes extending diagonally into the concrete, this unit being powered by a diesel generator mounted on a truck alongside. Aldrich is using a Jackson internal tube vibrator with generator mounted on the bridge. Both contractors are also employing gasoline engine powered spud vibrators at times along the forms and elsewhere, to insure uniformity to the satisfaction of the inspector.

Finishing includes use of a long-handled wood float, a long-handled steel lute and belt for herringbone finish followed by edging and curing membrane application.



★ Both contractors used the familiar mechanical applicator for curing liquid

Forms for the heavy pavement consist of 9 in. and 13 in. rails shored to the required height on wood sills. The contractors apparently hesitated to invest in higher forms due to infrequency of use. T. L. James & Co. recently put 2,000 lin. ft. of new Heltzel 13-in. forms on the job.

Pins for overlay pavement were driven through holes drilled in the old concrete at points accurately positioned by means of template planks, using a tow-type compressor and two

air hammers.

As a preliminary to overlay paving, the old pavement was first given necessary patching, but no leveling was done, the paver operation being preceded by a thorough washing with a solvent, flushing with water and sweeping. The base pavement has transverse joints every 20 ft. in most instances. The first yardage of overlay was placed with dummy joints spaced every 25 ft. as specified, with wire mesh reinforcement placed across base joint locations. Despite the reinforcement a fine crack has appeared at some of these joints. At this writing about 50% of the overlay paving had been placed, most of it with dummy joints spaced as nearly as possible over old joints. Spacing of the new dummy joints above joints in the underlying pavement has been effective in controlling any tendency for cracking to occur.

A considerable yardage of existing pavement required removal because of its condition or to meet grade requirements. An improvised truck-mounted drop hammer was used to fragment the concrete which was then loaded into trucks by shovel or loader for disposal.

#### High Speed Batching

The two batch plants are located on different sides of the field, each being strung out along 1,000 ft. or so of



★ Heavy-duty discing units got a work-out in aerating the wet subgrade soil during compaction

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## Equipment and Materials Used on Lake Charles Air Base Project

(As of March, 1952)

Equipment Item	T. L. James & Co.	W. R. Aldrich & Co.
<b>Grading</b>		
Shovels	1 Northwest	None
Draglines	1 1-yd.	1 Northwest 2½ yd.
Tractors	5 Caterpillar D8	5 Caterpillar D8
	1 Caterpillar D7	2 Caterpillar D6
	1 Caterpillar D6	1 International TD18
	1 International TD14	
Scrapers	3 Tournapulls	3 Tournapulls
Sheepsfoot rollers	5 drums 60"	9 drums 60"
	16 drums 40"	15 drums 40"
Pneumatic tired rollers	1 unit	2 units
Sprinkler tanks	1 1800-gal.	3 various
Disc units	2 tandem 20"	3 tandem 20"
Motor graders	2 Caterpillar	3 Caterpillar
Loaders	1 Allis-Chalmers ¾ yd.	1 Allis-Chalmers ¾ yd.
Earth wagons	3 Euclid 13-yd. (b.d.)	5 Euclid 13-yd. (b.d.)
	3 Koehring Dumpsters	
<b>Paving</b>		
Pavers	2 Koehring 34E dual drum	1 Rex 34E dual drum
	1 Koehring 34E single drum (standby)	1 Koehring 34E dual drum
Spreaders	1 Jaeger oscillating screed	1 Foote 34E dual drum
Finishers	1 Blaw-Knox	1 Blaw-Knox oscillating screed
Vibrators	1 Viber (vertical tube)	1 Jackson (horiz. tube)
Longitudinal Float	1 Koehring power float	Hand floats
Curing Application	1 Flexplane machine	1 Flexplane machine
Paving forms	4000 ft. 9"	2000 ft. 9"
	2000 ft. 13"	1000 ft. 10"
Form grader	1 Cleveland	1 Cleveland
	1 2000-gal. trailer	1 2000-gal. trailer
Water supply	3 500-gal. booster tanks	3 500-gal. booster tanks
Steel rollers	1 3-5-ton Ferguson	3 5-ton Ferguson
<b>Batching and Hauling</b>		
Bulk cement stations	1 600-bbl. bin and silo	1 Blaw-Knox 300-bbl. twin batch
	1 Blaw-Knox 300-bbl.	1 Johnson 15-bbl. twin batch
Coarse aggregates	Blaw-Knox 100-ton twin batch	Blaw-Knox 100-ton twin batch
Fine aggregates	Blaw-Knox 100-ton twin batch	Blaw-Knox 100-ton twin batch
Cranes	2 Koehring 1½ yd.	2 Northwest 1½ yd.
Bulldozers	1 Caterpillar D8	1 Caterpillar D7
Batch trucks	20 Chevrolet 2-ton	10 Ford 2½-ton
		10 Chevrolet 2½-ton
Flatbed trucks	2 Chevrolet	2 Ford 2½-ton
		1 Ford ¾-ton
Pick-up trucks	8 Various makes	6 Chevrolet and Ford
<b>Materials</b>		
Cement	Type 1, from Texas and Louisiana mills	
Gravel and sand	Thorslenberg & Tamborello, Eagle Lake, Texas	
	White Sand & Gravel Co., Kinder, La.	
Curing materials	Hunt	Hunt
Air entraining agent	Hunt	Hunt
Joint Sealing Compound	Paraplastic (std. and JFR), Seals and Aero Seals	

double-track rail spur to provide ample stockpiling space. The Aldrich plant includes a twin-hopper equipped bin for the two coarse aggregates, a second bin with twin hoppers for the two sand sizes, a 300-bbl. capacity bulk cement station with mechanical car unloader and one double batch portable scale unloader. The James plant is similar except that one twin-hoppered

and one single batch cement station is provided to insure top speed delivery to the pavers. Each plant has three cranes of 1½ yd. or larger clamshell capacity.

The job was slowed during 1951 by bad weather and the completion date has been extended from July 1 to September 1. However, the contractors had practically caught up with their

original schedule as of March 5, at which time 173,000 cu. yd. of the 429,000 cu. yd. in the job have been placed. The largest day reported this Spring was a combined pour of 4929 cu. yd. in one 9-hour shift, one contractor placing 60% of this yardage. This day's work constituted 12,163 sq. yd. of 13-in. overlay pavement representing 4,379 lin. ft. of 25-ft. lane. The job should average a 4,000 cu. yd. daily pace from here on.

The work has been slowed somewhat by the necessity of moving 4 miles of Missouri-Pacific rail line, being done under separate contract. Also complicating the paving work is the placement of about 40 miles of electrical duct which passes under the pavement at frequent points. Where ducts cross under the pavement a 20 ft. wide exception is being left by the paving crew. Later in the job, a paver will be brought back for filling in these gaps.

To expedite the job and insure proper control a well equipped testing laboratory was established on the field, the Corps of Engineers having a soils engineer and a concrete engineer each in residency, working with the Corps district office.

### Acknowledgments

Supervisory personnel for the Corps of Engineers on the project consist of Rex E. Pinkley, resident engineer; W. J. Griggs, assistant resident engineer; Stacy McKnight, soils engineer; and O. T. Hodges, concrete engineer. Col. J. D. Lang is district engineer at Galveston, J. C. Perrett is project manager representing the contractor and subcontractor.

### With the Manufacturers

**New Warco Distributor.** Vern Wheeler Equipment Co., Inc., Jacksonville, Fla., has been appointed distributor for the Warco line of motor graders of The W. A. Riddell Corporation, Bucyrus, O., for southern Georgia and northern section of Florida.

**Willard Equipment to Be Made in Ohio.** Announcement has been made by the Willard Concrete Machinery Sales Co., Lynwood, Calif., that Willard truck mixers and weigh batch loaders will also be manufactured in Galion, O., by the Hercules Steel Products Co.

**Appointed General Sales Manager.** J. C. Baseheart has been appointed general sales manager of the Engine Division of The Buda Co., Harvey, Ill.

**Byrom Appointed Sales Engineer.** John F. Byrom has been appointed sales engineer, Railway Division at the Minneapolis, Minn., office of The Timken Foller Bearing Co., Canton, O.

**Appointed Chief Engineer.** Edwin H. Keiper, heretofore chief service engineer, has been appointed chief engineer of the Pennsylvania Crusher Co., Philadelphia, Pa.

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## ROADS AND STREETS



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Blade mix in progress on a county road in Wisconsin. Grader is part of a fleet consisting of 4 graders, 1 pulverizing mixer and 2 distributors which processes a mile of road per day with gravel cold mix.

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How Wayne County Better Protects Patching Crews  
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**JUNE, 1952**

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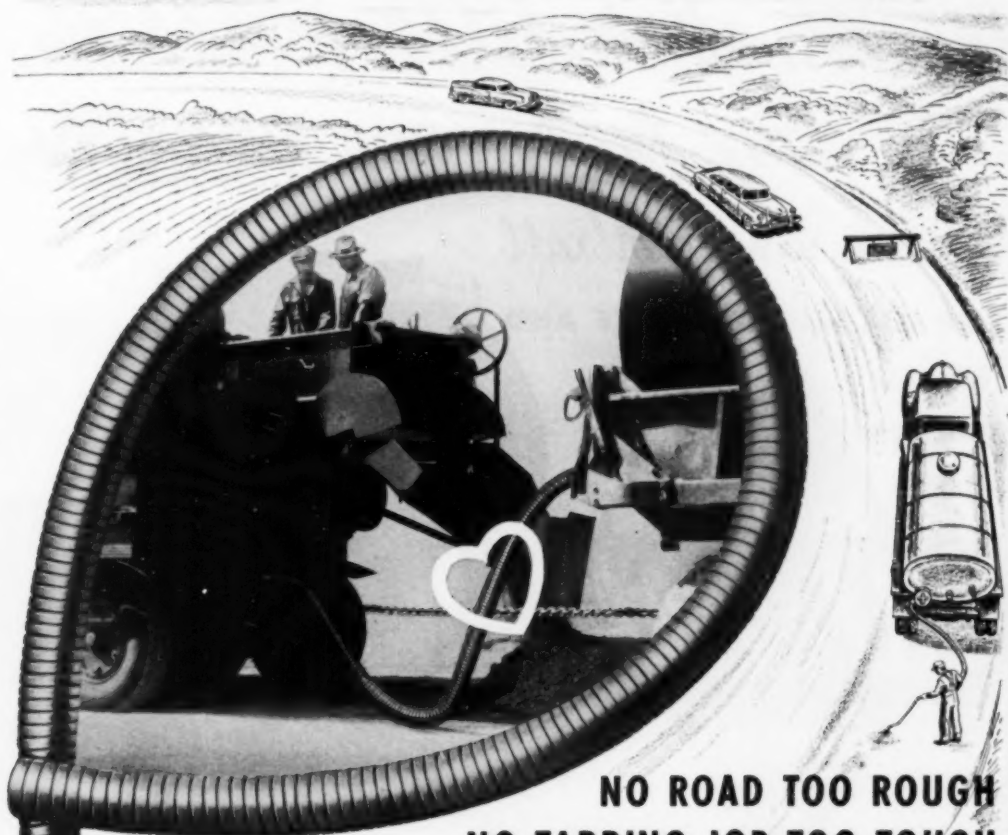
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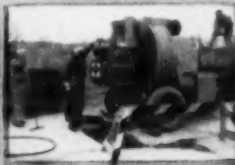
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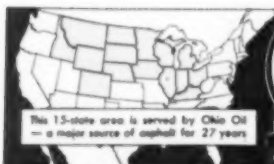


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# Oil Aggregate

## STREETS FOR FLINT'S NEW POPULATION

*Asphaltic surface on gravel base predominates in this city's postwar street development. Over 650,000 sq. yd. of surfacing or base completed last year, with similar volume requested by property owners for 1952.*

**T**HE city of Flint, Michigan (population 165,000) is engaged in a "catch up" job of street modernization reflecting the city's fast growth during and since the war years. About 30 miles of street paving was completed or begun in 1951, comprising 450,000 sq. yd. of surfacing of all kinds and 200,000 sq. yd. of base, curb and gutter construction carried over into the present year.

Flint's problem is a familiar one. Hundreds of blocks of new residential streets have sprung into being since 1940. The city is still trying to catch up with street work following the war-time moratorium. A beginning was made in 1946 with five miles of street improvements, mostly in outlying residential areas. Another 7 miles was improved in 1947, similar mileages in 1948 and 1949, with a spurt to 17 miles in 1950.

Most of this work has been performed on an assessment basis, as a result of petitions by property owners. The 1951 program was financed through assessment bonds totaling \$1,600,000. Abutting property owners pay off in six annual installments under Flint's scheme, their assessment

covering pavement width up to 26 ft., the city bearing the cost of any additional width. Intersection paving cost is prorated among property owners and is not borne by the city. Most pavement work is thus 100% borne by property owners.

The street is first graded using a pair of heavy motor graders or if the cut exceeds a foot or two a pull-shovel and bulldozer, loading excess material into trucks for disposal. In shallow grading the grader windrows excess material which is disposed of by power windrow loaders feeding into trucks. The typical street to be improved has a gravel surface which has been built up until the crown is excessive and the grade line too high. Surface material

usually must be removed, the subgrade finegraded, and after completion of curbs and gutters the new base constructed of imported gravel meeting specifications.

Capitalizing the abundant supply of good gravel found locally, the city has used for most residential streets a design consisting of a 6 in. compacted gravel base and 2½ in. oil aggregate surface. Base gravel in general is required to meet the Michigan state highway specification known as No. 22A, designed to insure stability and frost resistance. Flint specifications require that the material be graded from ¾ in. down, and have 7% to 12% clay binder. The gravel is placed and compacted in two 3 in. compacted



★ Placing oil-aggregate mix in Flint's 1952 street program



★ Shaving final cut for street subgrade, in advance of curb-and-gutter gang



★ Spreading clay-gravel for flexible base, using gutter as template line

★ New strongly built steel forms aided crew in constructing curb-and-gutter to accurate line and grade. 2 in. cushion previously placed, as part of first roadway base course. At right note opening for private driveway

thickness courses.

The top 2 in. of depth is stabilized by blending binder soil with a grader blade. As soon as the clay is worked in, the top material is windrowed and re-spread with an application of liquid calcium chloride. A second chloride application is sometimes made later, both the first and second dose consisting of about 5 to 6 lb. of calcium chloride per lineal foot of street.

The base is compacted largely by traffic, the street being opened to vehicles for a period up to three months, then skinned with a blade and trued up without disturbing compaction just prior to placement of surfacing. The city is considering the use of a pneumatic tired roller for base compaction, which would permit immediate placement of surface. Chloride

★ Grade cut of 2 to 4 ft. being made here for street paving along new homes



ride supplied under contract, the city taking bids both for delivery in place and into city-owned tanks. About 65,000 to 75,000 cu. yd. of gravel is contracted for annually, the material being spread-dumped by the contractor.

Oil-aggregate for surfacing is a cold mix consisting of  $\frac{1}{2}$  in. maximum crushed stone supplied under contract and mixed with SC5A asphalt in the city's plant. Some MC asphalt has been used also with success. This mix is similar to Michigan state highway department Class B-2 plant mix construction for highways except that no prime or bond coat is used. The mix is laid in one 2  $\frac{1}{2}$  in. compacted thickness course, using a mechanical finisher followed by thorough rolling, three 10 ton rollers usually being on the job.

Grading and curb-and-gutter construction have been performed by city forces, with three excavation crews and three curb crews working steadily. The city recently purchased two additional Caterpillar graders. Other city-owned equipment includes two Athey and one Pettibone-Mulliken loader, a P & H pullshovel, Bay City crane, Buckeye crane, two Caterpillar D6 tractors with dozer, two D2 dozers, Chevrolet and GMC trucks, Heltzel sidewalk forms, Blaw-Knox curb forms.

Flint's municipal plans include a comprehensive program of widening and repaving principal traffic arteries, to be financed under a \$12,000,000





★ Flint officials—T. A. Hammond, city engineer; T. D. Moss, director of public works

public works bond issue approved in 1951. This work will include about a mile of high-type paving near the Buick plant, and extensive sheet asphalt surfacing on other streets.

In addition there is a \$10 million water supply project under way involving \$2.7 million.

Theodore D. Moss is director of public works and T. A. Hammond, city engineer of Flint.

### Large Parking Lot Paved with Macadam

Extensive parking lot areas today are frequently deemed worthy of paving to high standards comparable to the standards used for city street work or for highway work. An example of this is the recent surfacing of a 5,500 sq. yd. parking lot for the Allen Chevrolet Company of North Kansas City, Missouri.

Following careful preparation of the subgrade which included thorough rolling, a 4-in. compacted thickness course of water-bound base was placed, using crushed rock graded in accordance with Missouri State Highway specifications as follows:

Passing 1½" Square Screen	100%
Passing 1" Square Screen	95-100%
Passing ½" Square Screen	60-85
Passing #4 Square Screen	40-60
Passing #40 Square Screen	15-35

The rock was placed on the subgrade, bladed, rolled and watered until a firm base was obtained. After this base was completed, a double seal coat was applied consisting of approximately 4/10 gal. per sq. yd. of MC-O cutback asphalt for a prime coat. As soon as the prime coat had cured, a seal coat consisting of 6/10 gal. per sq. yd. of MC-5 cutback asphalt was applied, immediately covered with ¾ in. limestone chips and rolled.

According to C. H. Soper, general superintendent of Midwest Pre Cote Company of Kansas City, Mo., this type of construction has made many friends among parking lot owners in the Kansas City area and is also applicable for other surfaces carrying

### Bituminous Test Road Under Construction

The second pavement test by the Highway Research Board to determine the effect of truck traffic on design—known as the WASHO Road Test—is under construction in Idaho. This test is sponsored by western state highway departments, the Bureau of Public Roads, and various members of the transportation industry. A new section of divided highway is being built on a relocation of U.S. Route 191 about half way between Pocatello, Idaho and Ogden, Utah, just north of the Idaho-Utah boundary. The road will be built in a valley on uniform silt subgrade. Excellent granular material for base and surface courses is available from nearby areas.

The test sections consist of two

pairs of 1,900-ft. tangents connected by super-elevated turn-arounds. Five different thicknesses of flexible type pavement will be tested in each of the tangents. Eight test vehicles will be operated in such a way that the relative effects of 18,000-lb. and 22,400-lb. single-axle loads and 32,000-lb. and 40,000-lb. tandem-axle loads on each of the various pavement designs can be compared. Construction is expected to be completed this summer so that test traffic can be operated for two or three months before the severe winter weather makes testing impracticable. Testing will be started again in the spring of 1953 and continue until a total of six months of operation has been completed.

light traffic. Mr. Soper notes that the owners usually have a keen interest and sometimes engage in controversy over the thickness of rock required to construct a good base for a parking lot. In his experience around Kansas City, a parking lot requires at least a 4-in. base and the use of 110 lb. of rock per sq. yd. for each inch of thickness.

### With the Manufacturers

**Elected Vice President.** William L. Weasly has been elected general sales vice president of Joy Manufacturing Co., Pittsburgh Pa., in charge of all domestic sales including Canada and Mexico.

**Allis-Chalmers Promotions.** A. E. Dorn, heretofore Pacific Coast manager, has been named industrial sales manager, Tractor Division, Allis-Chalmers Manufacturing Co., Milwaukee, Wis. He succeeds R. M. Stone who has resigned to become president of Cooke Tractor Co., Inc., St. Louis, Mo.; Allis-Chalmers industrial dealer, L. W. Davis, heretofore branch manager at Oakland, Cal., succeeds Mr. Dorn as Pacific Coast manager.

**General Tire Appointments.** Howard A. Bellows has been elected a vice president of The General Tire & Rubber Co., Akron, O., and has been placed in charge of all General's replacement tire and tube sales. John E. Powers, trade sales manager, has been promoted to general sales manager of plastics and special products.



★Applying prime coat for stone based parking lot in North Kansas City, Mo.



## of a Culvert, a Contractor, or an Operator an OWEN BUCKET *"looks good"*

To a practical person looking out of a culvert such as this one, comes the suggestion of exceptionally great and economical digging ability or an Owen Bucket wouldn't have been selected.

To the contractor it recalls consistently good performance for years which has prompted him to re-order Owen Buckets year after year.

To the operator comes a reminder of how an Owen Bucket performs under varying difficult conditions, responding to his every demand and "stands up" with outstanding ability long after many buckets would have been relegated to the scrap heap.



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at every bite*

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## North Carolina Plans Contract vs. Force Account Contest

(See Editorial in this issue)

To determine whether it can build roads cheaper than private contractors, the North Carolina State Highway Commission with the approval of the U.S. Bureau of Public Roads will conduct a contest.

The State Highway Commission will build two Federal-aid highway sections under force account in Chatham and Randolph Counties. For the private contractors, J. K. Cecil and Son and Dickerson, Inc., will build two similar road sections in Davidson and Lee Counties.

"Providing all conditions are about equal, this should prove to be a very interesting contest and many highway builders will follow it closely for comparative costs", notes a news release from the American Road Builders Association. Whether or not this question is resolved, this should at least be a hot contest inasmuch as there has been a long and bitter controversy over force account work in North Carolina.

## Contract Negotiated Below Lowest Bid

The Oklahoma Turnpike Authority established a precedent when it threw out the low bid on a 1.466-mile grading and drainage job and negotiated a contract that cut \$163,551 off the contract price.

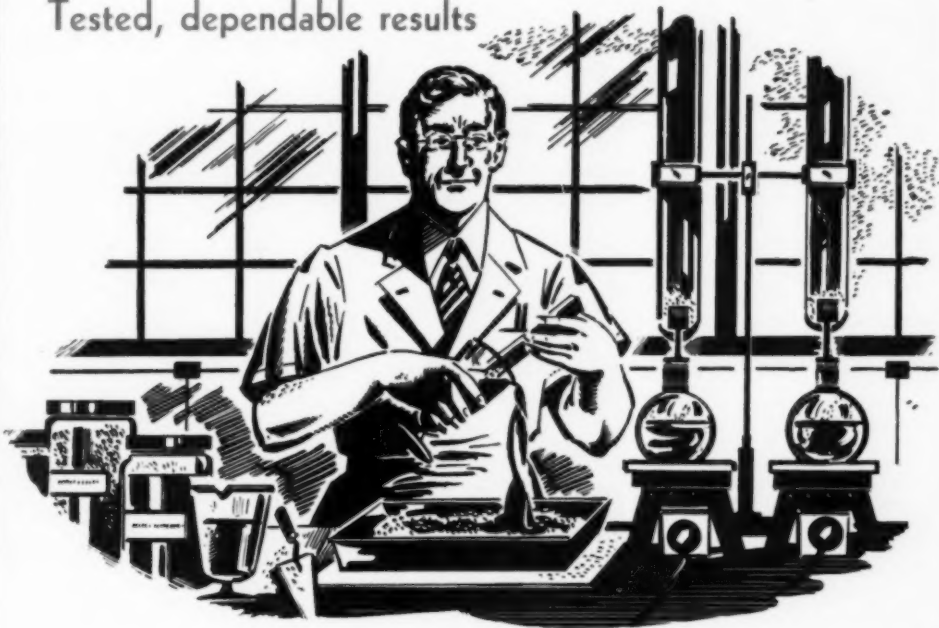
Amis Construction Co., Oklahoma City, submitted the only bid, \$811,265, on the project located in Creek county, exceeding the estimate of \$529,746 by \$281,519. The authority negotiated a contract with the S. E. Evans Construction Co., of Fort Smith, Ark., for \$647,714, or \$137,968 over the estimate.

This is the first time the board resorted to the negotiated contract method. The job was one of several making up the last construction on the 88-mile link between Oklahoma City and Tulsa.

## With the Manufacturer

Three New Huber Distributors. Huber Manufacturing Co., Marion, O., has appointed new distributors as follows: Watkins-Aldrich Equipment Co., 912 South St., Jackson, Miss., for central and southern Mississippi; Herman Brown Co., Inc., First and Sheridan Sts., Des Moines, Ia., for central and eastern Iowa; and Coast Equipment Co., 414 Eighth St., San Francisco, Calif., for about 50 counties in central and northern California.

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factual Data and  
specific help with  
your paving problem

# Dished Track Turns

## Resurfaced with Modified Finisher and Roller

ONE of the most unusual and difficult paving operations ever undertaken has just been completed at the General Motors Proving Ground, Milford, Michigan, 40 miles northwest of Detroit.

The job was resurfacing the steeply banked turns of the high-speed, five-lane, 3.8-mile track. Two turns have a maximum slope of 77%, the equivalent of a 37 degree angle. It is so steep that it is virtually impossible to walk up it.

The track was originally paved with concrete in 1926. The level and semi-level sections were resurfaced in 1944. An attempt was made then to resurface the two outside lanes on the banked turns. The job was found to be impossible with conventional paving equipment because of the steep slopes.

About a year ago, it was decided that some kind of a resurface had to be applied to the concrete turns. H. H. Barnes, director of the ground, assigned Louis C. Lundstrom, head of the ground's Mechanical Engineering Department, to find out how a paving finishing machine and a roller could operate at an extreme tilt without falling over on their sides down the track. Also, how they could resurface a saucer-shaped slope which the turns have.

Mr. Lundstrom made studies of the centers of gravity of the equipment, their thrust at various angles, and the modifications they would need to



★ This special equipment kept the 11-ton roller in place on the steep slopes. (1) Guide roller for cable from truck to roller; (2) Winch; (3) Buick Roadmaster engine for driving winch; (4) Counterweights, 2 tons. The cable was kept taut, eased or tightened through the Buick Dynaflo transmission

operate with full efficiency while leaning nearly over on their sides. No paving authority himself, Mr. Lundstrom simply applied basic engineering principles to his many and unusual problems. Eventually, he made his recommendations. Scale models of the two vehicles, paving equipment and a section of a banked turn were assembled to illustrate his ideas in three dimensions.

The Proving Ground went one big step farther. It built a 200-foot long,

concrete replica of a section of a turn to prove the method. There, it experimented with the tractor and finishing machine, and truck and roller, to double-check Mr. Lundstrom's findings. They were found to be correct, whereupon work began on the track itself.

First, roads were built adjoining the outside of the three turns. Next, concrete curbs were installed at the ground between the top of the turns and the roads. A tractor, on this roadway, held the finishing machine in place on the steep slope by means of a cable attached to its built-in winch.

### Cable Holds Roller

An 11-ton steel roller, which followed the machine, likewise was held in place on the slope by cable attached to a specially equipped truck, also on the roadway. The cable was held taut, or loosened or tightened to allow the roller to ascend or descend, by a Buick engine mounted on the rear of the truck. Tension of the cable was controlled through the engine's Dynaflo transmission. The maximum pull on this cable was about six tons. Two means were employed to keep the truck stable against this side pull.

★ Resurfacing a turn. Left to right, roller; finishing machine which spread the bituminous concrete mix; tractor which held the machine in place by cable; and special truck with bogie wheels which supported roller







★ T. E. Dougherty and G. E. Hodgins, assistant director and head of the Construction Department, respectively, General Motors Proving Ground, check the contour of a banked turn



★ 200-foot concrete test section used in adapting equipment for resurfacing the 77% slope

The truck was equipped with four bogie wheels, actually truck wheels and tires. Two of these wheels rested vertically upon the top of the curb. The others, mounted horizontally under the truck, bore against the outer side of the curb. In addition, on the opposite side of the truck, a counterbalance of two tons of cast iron was installed.

Cable anchorages on the roller were adjustable to effectively support it through the center of gravity on varying degrees of slope.

Those were the major measures used to lick the problems. Others, however, were little less perplexing. For example, the finishing machine was a conventional unit designed for use on reasonably level, crowned roads. Proving Ground engineers changed its design to lay and compact the mix on a reverse curve on a steep slope. They made changes in the carburetion and lubrication systems of the engine, to allow operation at an extreme angle. A running board, with steps, was built for the machine, so that workers could move where needed. Lastly, a hopper and conveyor were installed on the tractor, to feed the mix.

Even the roller underwent a major operation. Its three wheels, normally designed to roll flat surfaces, were shaped to conform with the average contour of the top of the curves.

Only 23 working days was required to resurface the 3.8-mile track, which General Motors uses for testing cars, trucks and buses for durability, fuel consumption, braking, handling and comfort at medium and high speeds, and for other automotive purposes.

### Technical Publications Received

A 130 page compilation of articles on "The Use of Agricultural Soil Maps and the Status of Agricultural Soil Mapping in the United States," has been issued by the Highway Research Board. Known as Bulletin No. 22, it reflects a definite trend toward the use of county soil maps and the profile method in soil survey practice.

The publication includes two papers as follows: (1) "Use of Agricultural Soil Surveys" — L. D. Hicks, Chief Soils Engineer, North Carolina State Highway and Public Works Commission. (2) "Significance of The Soil Survey Report In The Selection and Preliminary Assessment of Sites for Airplane Landing Strips" — Geoffrey B. Bodman, Professor of Soil Physics, University of California.

### Ray B. Traver

Raymond B. Traver, former president of the American Road Builders Association, County and Local Roads Division, died May 6. He had retired in June, 1951, after serving 29 years as superintendent of the Onondaga County Highway Department.

Mr. Traver won national recognition for design, construction and maintenance of secondary highways. Highway officials and engineers from distant states and Canada came to his county to study snow and ice removal operations. He was a booster for better highways. Because of his ability and practical planning, Onondaga County lays claim today to the best

roads in New York State. Pioneer use of 2-way radio on his maintenance equipment enabled him to give excellent snow removal service in his section of the state where the average annual snowfall was exceptionally high.

Other offices held by Mr. Traver included past president of the Association of Highway Officials of the North Atlantic States, county consultant to the Federal Bureau of Public Roads, member of the National Research Council and president of the New York County Highway Superintendents Association.

### With the Manufacturers

**Worthington Redesignates Plant.** What has been known as the Dunellen, N. J., plant of Worthington Corporation has been redesignated as the Plainfield Works. Though known as the Dunellen Works since 1943 when purchased from Ransome Machinery Corporation, the plant is not actually located in the town of Dunellen. It is located partly in Plainfield, N. J., and partly in Piscataway Township which is between Plainfield and Dunellen. To provide proper designation the name and address of this plant, immediately, will be: Worthington Corporation, Plainfield Works, Plainfield, N. J.

**Worthington Names Western Supervisor.** Walter D. Johnson has been appointed western regional supervisor of the sale of welding positioner and industrial mixers for Worthington Corporation, Harrison, N. J. His headquarters will be at Worthington's San Francisco office.

**George C. McClure Dies Suddenly.** George C. McClure, 46, executive vice president and general manager of Hercules Steel Products Co., Gallon, O., died April 26 of a heart attack.

**Bockmann Appointed District Manager.** George J. Bockmann, formerly a salesman for Omaha Body and Equipment Co., Omaha, Neb., has been appointed district manager, Southeast District of St. Paul Hydraulic Hoist, Minneapolis, Minn.

**Cleveland Rock Drill Appointments.** Jack Feucht, heretofore development engineer of the Cleveland Rock Drill Division of Le Roi Co., Cleveland, O., has been appointed chief engineer of the division. Theodore Schmidt has been appointed assistant chief engineer.

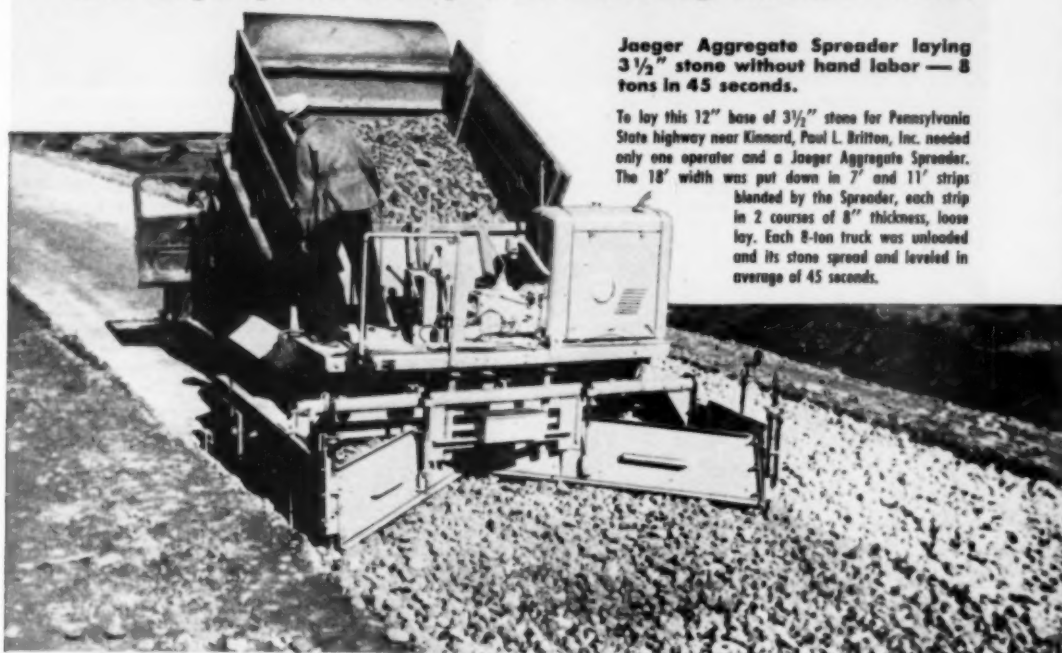


★ H. M. Barnes, director of the General Motors Proving Ground, and Louis C. Lundstrom, head of the ground's Mechanical Engineering Department, study scale models of equipment for paving job



# 7 WAYS TO MAKE MONEY

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**Jaeger Aggregate Spreader laying 3 1/2" stone without hand labor — 8 tons in 45 seconds.**

To lay this 12" base of 3 1/2" stone for Pennsylvania State highway near Kinnard, Paul L. Britton, Inc. needed only one operator and a Jaeger Aggregate Spreader. The 18' width was put down in 7' and 11' strips blended by the Spreader, each strip in 2 courses of 8" thickness, loose lay. Each 8-ton truck was unloaded and its stone spread and leveled in average of 45 seconds.

**Jaeger Paver-Type Aggregate Spreader**, costing only half the price of bituminous pavers, offers unequalled economies in laying all types of base and surface aggregates, plant-mixed stabilized soil or free-flowing bituminous mixtures. Can lay up to 10" thickness of coarse stone or 12" of fine or graded materials in widths to 11', or lay lesser thicknesses up to 12 1/2', in one pass.

Straightedge runners, which carry the strike-off, insure the accuracy required for highway, street and airport base, and the base and top of secondary roads, parking areas and drives. Crawler traction is entirely on the subgrade, avoiding displacement of the loose material. Machine can lay flush to curbs or headers and blend joints. Two models, to work with any size trucks you use.



**Labor-saving concrete paving with "3-screed team"**



**Jaeger Screw-and-Screed Spreader:** The only spreader equipped with a re-mixing screw and, for high production work, a 12" oscillating screed which accurately meters material for the finishing machine. No costly carry-back, no high or low spots; always uniform compression under the finisher screeds. Can also spread and finish concrete base for streets.

**Jaeger Diagonal Screed Finisher:** Completes today's "3-screed team." Equipped with transverse front screed followed by diagonally adjustable rear screed which works material up-hill on pitched slab and super-elevated curves and compacts it flush against the higher form. Saves hand labor, finishes faster without tearing, produces a smoother surface.



"Air Plus" Compressors do 4 days' work in 3

**Jaeger "2-Breaker" Model 125** makes 105 ft. compressors obsolete. This trench job with 2 heavy duty breakers moved 40% faster because Jaeger's 125 cfm of air at 100 lbs. held steady full pressure behind the tools, instead of a "loafing" pressure of 70 lbs. at which tools are inefficient.



**"Air Plus" Model 600** efficiently powers a heavy 9B-3 hammer. Jaeger was first to build a 600 ft. compressor needed to operate a big pile hammer, or 2 heavy duty wagon drills, effectively. Other Jaeger "new standard" sizes — 75, 125, 185, 250 and 365 cfm — offer comparable advantages.



**A Jaeger Never Races to Prime:** During 3 years' constant service on cofferdam work, these "Sure Prime" pumps often operated non-stop for months, at times repriming every minute at 20' suction lift, and never ran faster than 1200 rpm. Compare this performance, and resulting long life of Jaeger pumps and engines, with other pumps that must race at 2000 rpm to meet the same conditions.



**Jaeger Mixers for Big Yardage:** 5 to 7 seconds charging with Jaeger's automatic Skip Shaker loader, and equally fast discharge with the extra big bucket and flight blades of the Jaeger "dual mix" drum, shortens each mixing cycle, gains time for more batches. Machined steel drum track, Timken bearing rollers and heavy duty transmission insure longest life, free from breakdowns on the job.

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## Wayne County Adopts Better Protection for Patching Crews

**A**n approved protective system of traffic markers has been designed by the Wayne County (Michigan) Road Commission to protect its maintenance workers. The accompanying photo shows the details of this system being used in connection with late winter patching.

A large 36 in. square warning sign mounted on an 8 ft. reflector board, in turn supported on small rubber tired wheels, is placed facing on-coming traffic in the lane blocked off for workers. A watchman moves this sign as the work progresses. This sign has a big arrow and a striped warning panel together with flags as shown.

As further protection, the edge of the blocked-off lane is protected by a string of rubber traffic cones, each mounted on a wooden block, these cones being fastened together with chains. The string of cones is towed along by the material truck in such manner that workers are never without this additional protection.

These are some of the details developed by the Commission's Safety and Traffic Division headed by J. La-Mar Wehmeyer, following several accidents including two involving fatalities to workers or road users.

Wayne County is proud of its exceptionally low accident rate among its highway maintenance employees. During 1951, this figure was 9.85 accidents per million man-hours of work. In 1936, this rate was four times as

high. The severity rate for 1951 is only 1/7 of the severity rate of 20 years ago.

As a result of this progress, considerable money saving has resulted. The cost to the county of employee accidents has been reduced from \$2 down to about 25c, per \$100 payroll cost.

Wayne County, because of its metropolitan character and large size, has offered traffic engineering advice and service to 25 cities, villages and townships within its boundaries.

### Large Crossing Program

Mr. Wehmeyer's division has been enlarged until today it has 18 employees, 12 of which are electricians engaged in maintaining signs. A large part of the division's work is in connection with railroad grade crossing signals; the county has installed 3 to 10 new warning systems per year at major grade crossings which are still quite numerous in the Detroit area.

Grade crossing protection in Wayne County is financed in one of three ways. Federal Aid funds apply to 90% of the cost sometimes on secondary federal aid projects, the railroad paying the other 10% and all maintenance costs. At other times, the county pays for the installation and the railroads for the maintenance. Or the county and railroad split the initial cost, the railroads paying \$10.00 per month thereafter for maintenance.

## N. Y. Thruway Toll Equipment Bids Invited

The New York State Thruway Authority has invited proposals for a toll collection system to be used on the cross-state superhighway now under construction. Manufacturers of toll registration and office tabulating equipment were asked to submit proposals. Proposals for station structures, including toll booths and utility buildings, will be sought at a later date.

With the entire New York-Buffalo portions of the Thruway scheduled for completion in 1954, the Authority plans to have approximately one-third of the equipment in operation by January of that year; the remainder the following September.

Basically, the toll collection system proposed by the Authority is similar to those on the Pennsylvania and New Jersey turnpikes, with mileage fees collected at exit points. The unique feature of the New York Thruway system will be the use of "bargain rate" annual permits allowing owners of New York-registered passenger cars unlimited use of the highway.

Three types of toll stations will be required:

- (1) Interchange Control Stations (typical toll stations).
- (2) Barrier Control Stations, at the extremities of the control system, through which vehicles must pass onto uncontrolled sections.
- (3) Barrier Fixed-Toll Stations, located on portions of the Thruway without interchange control for the collection of fixed fees from vehicles passing through the barrier.

## With the Manufacturers

**Fletcher Promoted by Hyster.** Bob Fletcher, heretofore district representative in the tractor equipment division of Hyster Co., Portland, Ore., has been appointed eastern parts and service manager.

**Williamson Promoted by Bros.** A. O. "Archie" Williamson has been appointed manager of the road machinery division of Wm. Bros. Boiler and Manufacturing Co., Minneapolis, Minn. The company is now organized into three main divisions: road machinery, steam power and special fabrication. As one of the three division managers, Williamson will direct all sales programs, advertising and new product development for the road machinery division. Williamson joined the Bros firm in 1933, when the road machinery division was formed. He had served as sales engineer and general product engineer prior to being named manager.

**Allen Joins Wall Colmonoy.** Anthony J. Allen has joined Wall Colmonoy Corporation, Detroit, Mich., as eastern sales manager with headquarters in New York.



★ New protection system for patching crews, Wayne County, Michigan.

## Virginia Spring Clean-up Brings Mid-Summer Conditions Six Weeks Ahead of Schedule

**S**PRING clean-up drives are not unusual among state highway departments. In some states they are annual affairs, resulting in the picking up of tons of trash and general sprucing up of the roadsides, with attendant publicity and spring maintenance work given a good send-off.

In Virginia this year the Department of Highways staged a state-wide Spring Clean-up, which not only tied in with the state's Garden Week, but accomplished considerably broader purposes. Late in the winter it became apparent that the winter had been an exceptionally open one, and that an unusually early spring with relatively mild road damage would be experienced. Seeing an opportunity to get the early-spring type of maintenance done in a hurry, before the Spring rains, the Department's leaders mapped out a program as follows:

1. The program was set to begin March 17 and end April 25.
2. In this period each highway district was asked to map out an intensive job covering definite items, with two detailed reports to be rendered per week on the following work accomplished:

Miles of shoulder dressed  
Miles of ditches cleaned  
Miles of hard surfacing patched  
Number of pipes cleaned  
Number of signs cleaned, painted, repaired

Lineal feet of guard rail painted and repaired  
Miles of right-of-way cleared of trash  
Number of bridges painted and repaired  
Tons of loose aggregate removed from intersections  
Number of reflector buttons installed  
Number of stockpiles put in condition  
Miles of centerline painted

Reports were asked of all resident engineers, of which there are 43 over the state, each in charge of highway maintenance and construction in his residency covering one to four counties. (The Virginia department has charge of all roads in 97 of the 100 counties of the state.) Reports were simplified after the first few, emphasis being placed on the percentage of the total jobs accomplished each week, so that Department leaders could tell how the program was progressing. A final report was required from each residency and district.

The item of hard surface patching involved mainly bituminous type surfaces, for which cold mix was supplied either from stockpiles or purchased from commercial plants where available.

The item covering loose aggregate removed from the roadway at intersections perhaps needs explaining. It has been found that shoulder material, or road gravel on gravel roads, accumulates near stop signs, as a result of

brake action and skidding. This accumulation is hazardous, in that it contributes to skidding. On surface treated roads with painted traffic lines, the abrasive action of loose material necessitates frequent repainting of lines. Periodic clean-up at intersections has been necessary.

The Clean-up program was performed by the state's regular forces, using regular equipment, and thus did not involve any appreciable special expense. By concentrating their effort promptly on the work while conditions were favorable, the crews were able to get the work done economically, and to fortify the roads for rainy weather normally expected in April and May. The job was done on schedule, and as a result the personnel and equipment freed to make the earliest possible start of surface treatment and other summer-time work. "Midsummer" road conditions were reported by early May on most of the state's roads.

A total of 6,000 maintenance workers were engaged in the clean-up job. The men worked an extra 30 minutes per day and also three of the five Saturdays during the period, receiving overtime pay. Chief credit for the success of the program is given to the foremen and other district personnel.

H. H. Harris is maintenance engineer for the Virginia Department of Highways, of which J. A. Anderson is Commissioner and C. S. Mullen is chief engineer.

### Kansas Contractor Places 38,000 Ton Asphalt Job in 60 Days

With a "best day" of 1,250 tons of hot-mix asphaltic concrete laid in a 10½ hour working day, J. H. Shears Sons, Inc., of Hutchinson, Kansas, made fast work of a 16-mile widening



★ General view of J. H. Shears Sons, Inc., hot-mix plant in operation showing large stock piles and storage capacities for liquid asphalt. (Right): Spreader placing one of the base lifts





★ Trench roller on the top widening lift. (Right): early phase of widening job, consisting of scarifying and blading for widening trench

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TRUCK CRANE

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Up to 20 Tons



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- ★ 257 Mobile Type 1/2 Yard Excavator Crane up to 9 tons.
  - ★ 614 Crawler Type 1/2 Yard Excavator Crane up to 8 tons.
  - ★ 1020 Crawler Type 3/4 Yard Excavator Crane up to 10 tons.
  - ★ 1520 Mobile Type 3/4 Yard Excavator Crane up to 20 tons.
  - ★ 1014 Truck Crane 1/2 Yard Excavator Crane up to 12 tons.
  - ★ 1520T Truck Crane 3/4 Yard Excavator Crane up to 20 tons.
- All Models Convertible to ALL Attachments.

UNIT 1520T Crane offers "WIDE RANGE MOBILITY" plus a 20 ton lifting capacity and 3/4 yard for excavator service. It is mounted on a 3-axle, tandem drive carrier, designed and custom-built for heavy duty operation. DUAL POWER — one engine for travel, one for lifting or digging. Air brakes on all four rear wheels assure the operator of safe traffic speed travel. Unit's Full Vision Cab offers complete visibility for safe operation.

UNIT 1520T has 10 speeds forward and 2 reverse. Weight in excess of 50,000 lbs. assures maximum stability at any point of full-swing operation. Air control steering provides for smooth, effortless driving. An independent worm-type boom hoist permits power raising and controlled lowering of the boom at high speeds. Balanced hook roller construction assures increased stability of upper structure. Retractable high A-Frame handles capacity loads on an extended boom for long radius crane work.

Write for catalog No. 4000 and get all the facts.

#### UNIT CRANE & SHOVEL CORP.

6407 West Burnham Street  
Milwaukee, Wisconsin



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**UNIT "T-V SET"**  
Have UNIT brochure pen-  
trons the complete line...  
illustrates 10 reasons why  
UNIT is a better machine.  
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and resurfacing job.

This project involved modernization of a 2-lane roadway on U.S. 40 and U.S. 81 near Salina. It included 37,750 tons of asphalt mix, 1,400 sq. yd. of concrete patching and 840 stations of trenching and shouldering.

The work consisted of widening the base 2 ft. out on each side of the old pavement and resurfacing the entire road with a 1 1/2-in. leveling binder course and a 1 1/2-in. modified sheet asphalt surface course. The contract covered five separate roadway sections in the vicinity. The price was \$271,704.

Equipment used consisted of a Barber-Greene continuous type asphalt plant which embodied a Model 837 drier, Model 866 gradation unit, Model 848 mixer and 851 dust collector; two Barber-Greene finishing machines; two Galion rollers for bituminous work; an Apsco spreader for placing and rolling asphalt in the trenches to build up the base. The trenches were excavated by an Allis-Chalmers AD motor grader, and an Apsco trench roller was used for base materials.

The job was entirely completed in a period of 60 days. The trench for widening was excavated to a depth of 9 in. and the base built up in three layers of binder material. Over this and also over the old concrete surface, which had been previously patched, the two asphalt courses were then placed.

The plant alongside a railway spur received rock screenings, AC5 asphalt, crushed stone and stone dust, all shipped by rail and unloaded with under-car unloaders and belt conveyors to stock pile. A D7 Caterpillar dozer handled stock piles, pushing material to three feeders which conveyed material to the cold elevator of the plant. A Cleaver-Brooks 120 hp. steam boiler heated the asphalt.

Projects were under the supervision of resident engineer Nick Carter.

A 7043-121C



# WITH THE MANUFACTURERS & DISTRIBUTORS

**Hutchison Appointed Regional Manager.** J. R. Hutchison, heretofore compressor specialist in the export department, has been appointed regional manager for the Middle East for Worthington Corporation, Harrison, N. J. He will manage Worthington activities in Cyprus, Egypt, Greece, Iran, Iraq, Israel, Lebanon, Syria, Trans-Jordan and Turkey. His headquarters will be at Emlak Cadessi 2013, Istanbul, Turkey.

**Hyster Promotes Moody.** Robert F. Moody, heretofore assistant sales manager in the eastern division of Hyster Co., Portland, Ore., has been appointed eastern division industrial truck sales manager with headquarters at the Peoria, Ill., factory.

**Slottman Elected Vice President.** Directors of the Air Reduction Co., Inc., New York, N. Y., have elected George V. Slottman as a vice president. He has been the company's director of research and engineering since February, 1949, and will continue in charge of that activity.

**Gar Wood Personnel Changes.** H. H. Hippler has been appointed assistant director, sales and advertising, for Gar Wood Industries, Inc., Wayne, Mich. R. F. Whitworth, formerly sales manager, national accounts, succeeds Mr. Hippler as manager of branch division. Ross Miller, formerly manager of Gar Wood's factory branch in Chicago, has been appointed vice president and general manager of National Lift Co., Waukesha, Wis., a subsidiary of Gar Wood Industries.

**Joins Universay Concrete Pipe.** William H. Sprang, formerly with Illinois Division of Highways, has joined Universal Concrete Pipe Co., Columbus, O., as sales engineer at Pittsburg, Pa.

**Gar Wood Appointments.** R. S. Jay has been appointed sales manager of the Findlay division of Gar Wood Industries, Inc. R. M. Steegman has been appointed to Mr. Jay's former position as assistant sales manager in charge of Buckeye equipment. David J. Davis has been appointed assistant sales manager in charge of tractor equipment.

**Bucyrus-Erie Elects Officers.** Directors of Bucyrus-Erie Co., South Milwaukee, Wis., have elected N. R. Knox, president, vice chairman of the board. W. L. Little, heretofore executive vice president, was elected president to succeed Mr. Knox. P. H. Birchhead, vice president in charge of sales, was elected a director to succeed D. P. Eells who has retired after 45 years association with the company.

**Calhoon Rejoins Koppers.** Forrest O. Calhoon, president of the Disco Co., division of the Pittsburgh Consolidation Coal Co., became affiliated with Koppers Co., Inc. on May 1. Mr. Calhoon, who was associated with Koppers from 1927 to 1946, will serve as a technical advisor, reporting to Fred C. Foy, vice president and general manager of the Tar Products Division.

Preferred power on sickle-bar mowers and power scythes — the world's most widely used single-cylinder gasoline engines on hundreds of kinds and types of machines, tools, appliances, used by industry, construction, railroads, oil fields, and on equipment for farms and homes.

**WHEN** you want the best in machines, tools, appliances — equipped with the best air-cooled power — you will be sure if they are powered by Briggs & Stratton — the recognized leader in single-cylinder, 4-cycle, air-cooled gasoline engines. Briggs & Stratton Corporation, Milwaukee 1, Wisconsin, U.S.A.

In the automotive field Briggs & Stratton is the recognized leader and world's largest producer of locks, keys and related equipment.

# Notes on Equipment and Materials For ENGINEERS AND CONTRACTORS

## 1 Portable Hot-Mix Patching Unit

A new portable, one-unit dryer-mixer combination for patching and small job paving developed by Barber-Greene Co., provides the means for on-the-spot production of the same high-type hot bituminous mix used in highway construction. The skip discharges the aggregate into a rotary drying drum. Flights around the drum's inner circumference lift the aggregate particles and drop them, repeatedly through a blast of hot gas and flame provided by an oil burner. The force of this heated blast drives off the moisture re-



Barber-Greene's New Mixall

moved from the aggregate, exhausting it through twin stacks. The drying cycle is set at any predetermined number of drum revolutions; these being indicated on a large revolution counter at the rear of the drum. From the drum, the heated, dried aggregate is chuted into a twin-shaft pugmill. Just as the dryer employs the same principle as used in the largest B-G high-type plants, so does the pugmill operate exactly as do those on the larger plants. Both drying and mixing can be treated as separate operations or can be coordinated into cycles of equal duration. At the conclusion of the mixing cycle, the entire bottom of the pugmill opens, permitting the mix to fall into a wheelbarrow or directly onto the ground, in the area being patched. The machine also can mix all types of stabilized materials for base patching and can also produce portland cement concrete including low slump types. Barber-Greene Co., Aurora, Ill.

## 2

### Ditcher-Dozer

A new model ditcher announced by Shawnee Manufacturing Co., is stated to dig 7 ft. deep to reach 11 ft., and to dump 60° to either side. It has a heavy duty hydraulic system assuring longer life and better digging ability. The dozer has up or down pressure, with the double acting hydraulic system giving positive operation. All thrust is from underside of differential and there is no strain on tractor. Front axle 5 1/2 ft. wide; blade 22 in. high. The hydraulic bucket of this ditcher enables straight down digging, it also clears 8 ft. 6 in. for loading



Shawnee "Scout" Ditcher-Dozer

trucks. Bucket sizes available are: 12 in., 16 in., 18 in., 20 in., and 24 in. The equipment is designed for Ford, Ford-Ferguson, Ferguson and many other tractors. Shawnee Manufacturing Co., 1947 N. Topeka Ave., Topeka, Kan.

## 3

### Spreader Box

Four-wheel mounted, increased capacity and screw-lifting adjustable tail gate are features of a new spreader box announced by Wood Manufacturing Co. This spreader is designed for measuring and forming stabilized base, roadmix or



Wood Spreader Box

hotplant materials into uniform windrows. It is said to meet completely the growing trend on the part of engineers to specify that materials dumped on the roadbed must be measured. The unit attaches directly to the dump truck and measures the materials as the truck moves along. The select or imported material flows from the truck through the adjustable gate of the Wood spreader box and onto the base in one operation. Windrow capacities up to 8 cu. ft. are controlled by adjustable tail gate. The Wood spreader box saves straightening up dumped materials which are unmeasured and eliminates guesswork by assuring controlled quantities of materials, it is claimed. Bulletin and prices may be had by writing Wood Manufacturing Co., P. O. Box 620, 6900 Tujunga Ave., North Hollywood, Calif.

## 4

### It Measures As You Walk

A new model rolatape has been announced by Rolatape Inc. This Model 400 has a measuring wheel exactly 4 ft. in diameter and measures distance up to

100,000 ft. and then repeats cycle. It accurately measures and records as it is wheeled over course. The wheel does not sway in operation but tends to stabilize its course and follow a straight line. The Model 400 has been extensively field tested and is being used in the



The Rolatape

construction field and in winter works applications. The rolatape measures around corners and over contours with equal facility and accuracy. The Model 400 weighs 5 lb. and is easily and efficiently operated by one man. It also can be operated by the driver of a car as he drives slowly over the course to be measured. Rolatape Inc., Santa Monica, Calif.

## 5

### Power Sweeper

A new power sweeper, Model 1000-S, announced by Wilshire Power Sweeper Co., is designed for multipurpose service on all types of floor and pavement surfaces. In addition to continuous duty equipment which includes side-sweeper, floodlight, tail light, side spot light, horn, battery case and switches, the model has a self-starter motor, storage battery and generator. Transmission is automatic



Model 1000-S Power Sweeper

type with 3 speeds forward and 1 reverse. The patented "Duscon" system eliminates all need for sprinkling or sweeping compounds to lay the dust. It draws dust-laden air from the top of the hopper, discharging this air through a cyclone-type spinner which separates the dust from the debris. It is stated that the 48-in. Model 1000-S will sweep in excess of 90,000 sq. ft. per hour and that the 36-in. size will sweep over 65,000 sq. ft. per hour. Wilshire Power Sweeper Co., 526 W. Chevy Chase Drive, Glendale 4, Calif.

6

#### Color Coatings for Bituminous Pavements

Two new color coatings, created primarily to beautify bituminous pavements, but also prove excellent for water proofing and beautifying concrete or cinder blocks, brick and masonry walls, walks, etc., have been announced by Troyer Driveway Service. Decora is an inexpensive (about 1 ct per sq. ft. of non-porous surfaces) colored asphalt emulsion that has excellent hiding power. Waterproof, it will not stain from dirt, smoke or dust. Decoratex has a base of latex which is claimed to not only produce a tough, brilliant and durable surface, but one that is resistant to salts, gasoline and many acids (including those of animal secretions). Decoratex also is stated to have proven itself to be very successful for concrete and other types of floors, since it can be waxed and is easy to keep clean. Troyer Driveway Service, 2157 South Park Ave., Buffalo 20, N. Y.

7

#### Truck Engine

A new high-compression GMC truck engine stated to have the best power-to-weight ratio ever achieved in the trucking industry has been announced by GMC Truck and Coach Division of General Motors. Exclusively truck-engineered and



GMC's New 302 Cu. In. Truck Engine

truck-built, the new 302 cu. in. engine has a compression ratio of 7.2 to 1 and generates 145 gross brake horsepower at 3,600 rpm. It weighs only 545 lb. (dry). The new engine will be paced in the GMC 450 and 470 (2½ ton and 3 ton) model series trucks and tractors.

8

#### Hydraulic Truck Crane

A new model of the Pitman Hydra-Lift, recently developed crane with hydraulically powered boom that can be mounted on the frame of any truck, 1½ tons or larger, has been announced by the



**PERFECT FOR  
MUNICIPAL  
PAVING,  
HIGHWAY  
WIDENING  
and PATCHING,  
BRIDGE DECKS,  
WALKS, ETC.**

## JACKSON

### THE INEXPENSIVE SCREED THAT BOOSTS PRODUCTION — LOWERS COSTS!

Wherever the Jackson electric vibratory screed is seen in action its great superiority is readily recognized; and those who have used it proclaim it the most convenient and productive screed on the market. It strikes off to any crown, undercuts at curb or sideform, works up to and around all obstructions. Permits pouring slabs up to 30' without center joint. Requires only two men on widest slab and is the only screed that can be rolled back for second passes on 4 rollers. Powered by Jackson 1.25 KVA Power Plant. For rent or for sale at your Jackson distributor. Details on request.

**HIGHWAY  
WIDENING  
and PATCHING,  
WALKS, DRIVES,  
RAILWAY  
PLATFORMS and  
CROSSINGS, ETC.**

## and for ASPHALT COMPACTION

### A SMALL, HIGHLY MOBILE OUTFIT THAT OUTSTRIPS MUCH MORE COSTLY EQUIPMENT ON MANY JOBS!

The Jackson Vibratory Compacting outfit is the slickest thing for the purpose you have ever seen. The Compactor, small as it is, delivers up to 4500 1¼ ton blows per minute; propels itself and will compact 900 to 1200 sq. ft. per hour close to maximum density of asphaltic mix used. Easy to move from one location to another by means of quick pick-up trailer unit on which Power Plant is mounted. Also ideal for granular soil compaction. For sale or rent at your Jackson distributor. Details on request.

**JACKSON  
VIBRATORS, Inc.**  
LUDINGTON,  
MICHIGAN

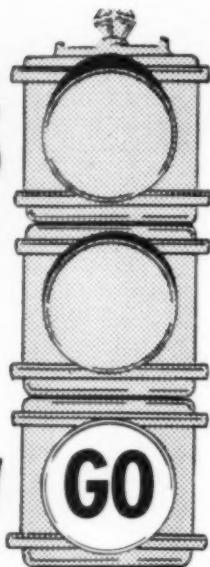
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GILLETTE'S HEAVY  
CONSTRUCTION  
PRE-FILED  
CATALOGS



# Bitucote

## PRODUCTS

**BETTER  
PAVING...  
from the word**



### BITUCOTE Emulsified Asphalts

- SEAL COATING
- PLANT MIX...
- ROAD MIX...
- TRAVELING PLANT MIX
- PENETRATION...
- BASE STABILIZATION...



#### FREE BITUCOTE BULLETIN

Send for your copy of Bulletin: "PAVE IT BETTER WITH BITUCOTE"—illustrated information on use of Bitucote for Road Mix, Penetration, Plant Mix, Surface Treatment, Base Stabilization.

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1411 CENTRAL INDUSTRIAL DRIVE • ST. LOUIS 10, MO.  
Plants: St. Louis, Mo. • Cincinnati, O. • El Dorado, Ark. • Butler, Ind. • Laurel, Miss.



Hydra-Lift Model B

Pitman Manufacturing Co. According to the manufacturer, the new model Hydra-Lift—Model "B"—features a variety of improvements over the original production model, introduced late in 1950. Hydra-Lift requires but 40 in. behind the cab of a truck, has a loadline capacity of 6,400 lb. and a swinging boom which telescopes from 12 to 17 to 22 feet. The two chief improvements in the new model are (1) a big increase in the unit's safety margin and (2) the fact that it now is shipped almost completely pre-assembled, cutting measurably the time and cost of installation. The safety margin has been increased by raising about 18 in. the point on the crane's mast where the topping cable is anchored. This results in a wider angle between the boom and topping cable, giving the boom a much better lifting advantage. Pitman Manufacturing Co., 300 West 79th Terrace, Kansas City 5, Mo.

#### Steel Folding Rule

A bright white enamelled 6 ft. zig zag folding rule made of a special hardened and tempered alloy steel has been announced by Durall Tool Corp. It is stated that the rule can be bent and twisted and yet will always spring back to its



Demonstration of Bending Qualities of New Durall Rule

normal shape. It weighs 3 1/5 oz. The rule can be used to take inside measures; measure pipes, rounds, and pulleys; as a straight edge to draw lines on paper or boards. Also, extends rigidly for out of reach measurements. The rule can be opened up on the job and left open while working, accidentally stepping on it will do no damage—it will not bend or break. Does not have to be closed each time it is used to prevent breakage. Durall Tool Corp., 117 Woodworth Ave., Yonkers, N.Y.

#### 10

#### Brazing Alloy

Phos-Copper, a free-flowing brazing alloy with a low melting point for brazing operations on copper and copper alloys, is available in paste form from Westinghouse Electric Corporation. An alloy of copper and phosphorus, Phos-Copper's fluidity and wetting properties provide good capillary action that enables it to penetrate tight-fitting joints instantly to form a strong, ductile bond. On most copper applications, no flux is required. The new brazing paste is finely powdered Phos-Copper suspended in a petroleum



Jelly. A small amount of this paste placed between the pieces being joined takes the place of a brazing rod, and the joint need only be heated until the brazing filler metal flows. It is designed for resistance brazing where it can be conveniently pre-placed. This brazing alloy also is available in rod and wire sizes from 1/16- to 1/4-in. diameter and in rings and strips (for making special shapes). Westinghouse Electric Corporation, Box 2278, Pittsburgh 30, Pa.

11

**Diesel Truck-Tractor**

Reo Motors, Inc., has entered the diesel field with a tractor model. The new model is the F-23DT, a high-speed truck-tractor powered by the new, light-weight, Cummins JBS-600 diesel engine. "The standard F-23DT chassis and cab with 20 gal. of fuel and all tractor equipment, except the fifth wheel, weighs approximately 9,475 lb.

The F-23DT has a gross tractor rating of 50,000 lb. and a 130 in. wheelbase. Reo "More-Load" design is followed in the construction of the F-23DT, with its



Model F-23DT Diesel-Powered Tractor

**Do your sealcoating  
and ice control jobs  
the fast easy Swenson way.  
Spreads salt, chloride, sand,  
rock chips, gravel or cinders any  
width or amount desired.**

Free Information

**Swenson Spreader & Mfg. Co.**

Lindenwood, Illinois



short wheelbase that reduces turning radius, both left and right, to only a few inches over 21 ft. The unit also has a new Timken, two-speed, double reduction axle designed for highway operation, the QT-300. Reo Motors, Inc., Lansing 20, Mich.

12

**Tractor-Shovels**

A new line of Drott skid-shovels is in full production by Drott Manufacturing Co. These units are built exclusively for International Tractors in these models and sizes: TD-9, 1 1/2 yd.; TD-14A, 2 yd.; TD-18A, 3 yd. All hydraulics in the new skid shovel are fully enclosed and protected. The rear end is free for mounting auxiliary equipment. Low overall clearance permits work in confined areas. A



New Drott Skid-Shovel

patented Drott feature called Break-Out Action is claimed to give the bucket a crowding action at every bite, assuring a heaped load from any cut. The bucket is rolled back as much as 28 in. before the load is lifted. The force of this prying

# Supply Tanks FOR HAULING HOT OR COLD BITUMINOUS MATERIALS



Semi-Trailer models are made by the famous Littleford Frameless Construction — no trailer frame is needed.



The Littleford Supply Tank transfers its Bituminous Material to the Bituminous Distributor for fast economical spraying.

To keep the Spraying Units on the job the Littleford Supply Tanks haul the Bituminous materials from the source of supply without interruption. These Supply Tanks are the backbone of all road construction and maintenance jobs. Made with or without heating units or transfer pumps, these units speed up the work, are economical to operate and save labor costs. Made in semi-trailer or truck mounted models in sizes ranging from 2000 to 5000 gal. Semi-Trailers are made without the use of a trailer frame known as the "Littleford Frameless Constructed Supply Tank."

Make your next road job a low cost modern undertaking, use modern methods and modern equipment, Littleford Supply Tanks.



**LITTLEFORD**

LITTLEFORD BROS., INC.  
454 E. Pearl St., Cincinnati 2, Ohio

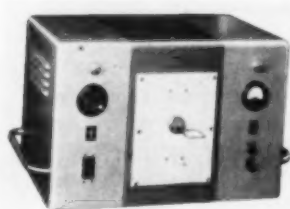


action is transmitted through the loader shoes into the ground—not into the tractor. Another exclusive Drott feature, which is standard equipment on the Skid-Shovel, is the Hydro-Spring. A pressure line running from the main lift rams to the Hydro-Spring puts the hydraulic system under spring tension and is claimed to reduce hydraulic shocks by two-thirds. Drott Manufacturing Co., Milwaukee 12, Wis.

### 13

#### Heating Unit for Soldering

A new electronic high frequency heating unit for soldering, brazing, annealing and other controlled heat applications has been developed by the Lewis Machine Co. The unit—called the "Lewis 1500"—is designed for use with either ferrous or non-ferrous metals in all metal working



Lewis 1500 Heating Unit

fields. A skilled operator is not required. Weighing 350 lb. and costing approximately \$500, the unit is controlled by an automatic timer switch which may be pre-set from zero to sixty seconds. When the machine is

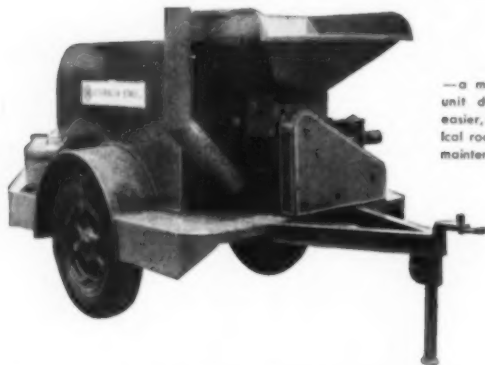
turned on and the timer switch set, the object to be heated is placed within a copper work coil in front of the unit and the timer switch activated for each exposure by a simple push button. Coils and accessory equipment are available to meet an infinite range of heating applications. Pre-assembled or pre-positioned parts may be heated while in motion on a conveyor or turntable. Dept. KP, Lewis Machine Co., 892-4 Newcomb St., St. Paul 6, Minn.

### 14

#### Cooling System Filter

Reduction of wet-sleeve pitting in industrial diesel cooling systems by as much as 70% is claimed for the Perry cooling system filter, announced by the Spark-O-Liner Corp. The replaceable element-type Perry filter is stated to combine best known means of counteracting the unfavorable water conditions encountered at most construction, mining and drilling

## The Moto-Patcher



—a mobile mixing unit designed for easier, more economical road and street maintenance.

### for speedy, low-cost patching

● The Moto-Patcher delivers up to 10 tons per hour of *freshly mixed* material. The aggregate may either be shoveled into the hopper, or fed into the hopper by a small elevator (optional equipment). The mixed material is deposited on a pan of convenient height for easy shoveling, or it can be dropped directly onto the road surface. The 400 gal. tank assures an adequate supply of bitumen for uninterrupted production, making frequent stops unnecessary. The mixer, running through the bitumen tank, provides a drying action for the aggregate. If desirable, bitumen may be circulated when machine is not mixing.

Bulletin MP-51, giving specifications, flow diagram and complete information, will be sent on request.



NETHERINGTON & BERNER INC., 721 Kentucky Avenue, Indianapolis 7, Indiana



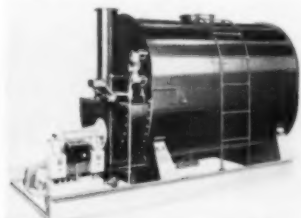
Perry Filter Model TB

sites. Rusting, pitting, hardness desposits, acid or alkaline conditions, and insoluble impurities, are controlled by a combination of mechanical filtration, chemical additives, and electro-chemical protection. A synthetic zeolite exchange bed removes mineral hardness and dissolves previously deposited scale; insoluble particles are filtered out of the circulating coolant. Spark-O-Liner Corp., Minneapolis, Minn.

### 15

#### Oil Booster

A new heavy-duty, high temperature oil booster, added to the Cleaver-Brooks line of road machinery asphalt heating equipment, is a self-contained fully automatic heating unit operating on the principle of a closed heating system, vented



Heavy-Duty, High Temperature Oil Booster

to atmosphere. Features claimed for the booster include quicker heating, reduced maintenance, quicker shutdown, positive heat circulation, higher temperatures, lower operating costs and trouble-free design. The unit is always at atmospheric pressure. Pressure developed by the circulating pumps is considered sufficient for the majority of installations. The new booster is claimed to enable the user to maintain higher temperatures in heating bituminous and heavy viscous material employing high temperature oil. A tight coil system guarantees a negligible loss of heat transfer oil through evaporation. Cleaver-Brooks Co., 326 East Keefe Ave., Milwaukee 12, Wis.

# **16 Scraper**

A new No. 60 scraper for use with D6 tractor power has been announced by Caterpillar Tractor Co. The new unit has a flat-bottom bowl and stinger blade engineered for loading and finishing characteristics. The reversible blade cuts a 7 ft. 8 in. swath; the bottom is double with steel beam fillers. Capacity of the No. 60 has been increased to 7 cu. yd. struck and



Cat No. 60 Scraper

9 cu. yd. heaped. Top extensions or sideboards are available to boost this capacity to 8.3 cu. yd. struck and 11.5 cu. yd. heaped. Maximum carrying capacity is 11.5 tons. Also included are such design details as an unobstructed bowl, tapered roller bearings at the axles, induction hardened sheaves and bulldozer-type ejection. Operation is by means of a Cat cable control available for attachment to the tractor. Shipping weight of the Cat No. 60 Scraper is approximately 13,500 lb. Caterpillar Tractor Co., Peoria 8, Ill.

# **17 Sweeper**

A new general purpose sweeper specifically designed for the International "Cub" tractor is in production by the Meili-Blumberg Corporation. The brush is hydraulically raised and lowered, and is rotated from the rear power take-off. All shafts turn on self-aligning ball bearings and are fully shielded for safety. Tubular frame runs under tractor, with an adjustment provided to compensate for wear of brush and road contour. The dust hood may be easily removed for snow sweeping. Palmyra stalk is employed in the brush, which is re-fillable.



New M-B Sweeper



This shows the Model DD Sand, Cinder, Chip, and Calcium Chloride Spreader applying a seal coating of sand on newly laid oil in Florida. This unit is equipped with a 1 1/2 horsepower Briggs and Stratton Gasoline Engine. The throttle on the engine controls the width of spread and the adjustable feedgate controls the thickness of spread. This unit can be changed from one truck to another by two men in less than one minute and it spreads from a minimum of 4-feet to a maximum of 40-feet in width.

This is an all-year-round unit as it is used for spreading sand, cinders, rock salt, and other types of material for ice control in the Winter months then for other types of material for seal coat work as well as calcium chloride for dust control.



The Model R Mi-Way Material Spreader in action, applying a seal coat of chips or small stone over a bituminous base highway in Minnesota. You will notice the even and uniform spread. This equipment is available in different sizes as follows: 8, 9, 10, 11, 12, and 13-ft. It will spread from real fine sand up to 1 1/2 inch stone. The gears and sprockets used on this unit are steel cut and the bearings are of the self-aligning ball bearing type.

## **HIGHWAY EQUIPMENT COMPANY, INC.**

Manufacturers of the World's Most Complete Line of Spreaders

616 D AVENUE NORTHWEST

CEDAR RAPIDS, IOWA

This equipment is sold and serviced by leading construction machinery dealers throughout the United States, Canada, and foreign countries.

## **HARDY SCALES COMPANY**

5701 So. Atlantic Blvd.  
Maywood, Calif.



Manufacturers of  
Hopper Scales and  
AUTOMATIC BATCHING  
EQUIPMENT  
as used on the  
New Jersey Turnpike



Write for  
Descriptive Literature



## **OVERMAN'S STONE AND BITUMINOUS SPREADER**

### **DESIGNED AND BUILT BY A PAVING CONTRACTOR**

After years of personal experience in laying asphalt, Mr. Overman saw the need of a light-weight bituminous spreader, primarily to cut the cost of hand labor and time; thus he designed the OVERMAN SPREADER UNIT to lay materials many tons faster per hour and to reduce labor to a minimum.

**I.J. OVERMAN MFG. CO.**  
BOX 203 MARION, IND.

## BITUMINOUS ROADS AND STREETS

Brush dimensions are 25 in. diameter, 72 in. length, providing a 60 in. sweeping path. Meil-Humbert Corporation, New Holstein, Wis.

### 18 Dump Trucks

Heavy duty dump trucks with the Super-Traction planetary type drive axle are now in production at the Sterling Division plant of The White Motor Co. for use by the U. S. Air Forces. The chassis is powered by a 250 h.p. engine and the transmission is of the ten-speed type. Tires are 13.00-24, 18-ply rating lug tread on the front wheels and 16.00-25, 24-ply rating lug tread duals on the rear wheels. Exceptional maneuverability and ease of operation is claimed through the use of a hydraulic power-actuated steering gear. Capacity of the unit is ap-



New Heavy Duty Off-Highway Truck

proximately 15 tons, and the rock type body has a water-level capacity of 10 cu. yd. The hoist is of the hydraulic dual telescopic type, power up and power

## 11" DEPTH .... STONE WELL PLACED



Not hard to see that this is the work of an APSCO Base Paver.

Nor is it difficult to see why this paver is so popular with road builders. With a spreading width of 8' to 12', depth to 12", 150 tons per hour capacity and *no forms required*, it is really indispensable for speedy, economical base paving.



Photos—Courtesy Macadam Pavements—Columbus, O.

### OTHER APSCO PRODUCTS:

Road wideners, trench rollers, bituminous pavers, widening chippers, etc.

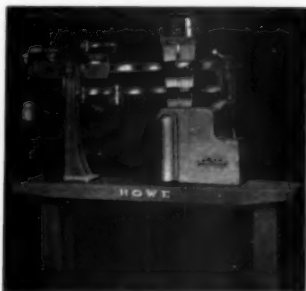
Send for details

**ALL PURPOSE SPREADER CO. Elyria, Ohio U.S.A.**

down with an especially high dumping angle to permit of clean and rapid discharging of the load. Sterling Division, The White Motor Co., Milwaukee 1, Wis.

### 19 Makes Beam Scale an "Automatic"

A new scale unit, the Weightograph, announced by The Howe Scale Co., featuring a new projection type of weight indication, can be attached to any make of beam scale, or to any scale convertible to beam operation, making an old-fashioned beam scale an "automatic" of the latest type. The Howe 77 Weightograph is simply attached to the beam shelf and connected to the beam with a rod. The Weightograph features a non-pro-



Howe 77 Weightograph

truding periscope with a convenient eye-level screen which instantly flashes the exact weight in large, illuminated, crystal-clear figures for easy, speedy and accurate reading. It is designed with the latest methods of optical projection which increases image brightness and contrast five times. The image is read off the mirror instead of a ground glass screen, which contributes greatly to the readability of the image under all sorts of light including daylight. The reading line length is 180 in. The Howe Scale Co., Rutland, Vt.

20

### Multiple Shot Blasting Unit

A new multiple-shot blasting unit, said to incorporate improved firing action, safety and dependability in a compact and lightweight assembly, has been introduced by Mine Safety Appliances Co. The new unit (U. S. Bureau of Mines Approval No. 1608) weighs one lb., measures 2½ in. x 2¼ in. x 4¼ in., and is



MSA Multiple-Shot Blasting Unit

# Proved Performance



## *on the toughest jobs*

On a wide range of jobs and under the toughest conditions, "Eucs" move more loads or tons per hour at the lowest cost. Large capacity, long life in heavy duty service, and speed on the haul and dump—these are features that assure low cost hauling and dependable performance.

Bottom-Dump Euclids have proved their rugged staying power and ability to do the toughest jobs in off-the-highway construction and industrial work. Powered by diesel engines of 190 to 300 h.p., they range in capacity from 13 to 25 cu. yds., and have top speeds loaded up to 34.4 m.p.h.



Rear-Dump "Eucs" are designed and built to move rock, coal, ore, overburden and other heavy excavation. They range in capacity from 10 to 34 tons, have top speeds up to 36.3 m.p.h. with full payload, and diesel engines of 125 to 400 h.p.

For help with your off-the-highway hauling problems, call your Euclid Distributor today or write for information on the complete line of Euclid equipment for moving earth, rock, coal and ore.

*"EUCS"* are job proved for more loads  
per hour and more profit per load.

**The EUCLID ROAD MACHINERY Co., CLEVELAND 17, OHIO**



# EUCLIDS



*Move the Earth*



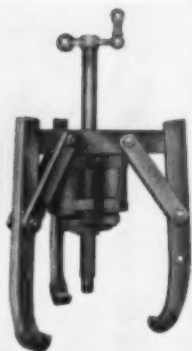
carried on the belt by means of a snap-on clip. It will fire up to 10 shots simultaneously. There is no danger of accidental firing, designers point out, as the wiring circuit is completely insulated from the battery container. And because the new unit is capacitor-operated, the full charge is dissipated with each shot, eliminating misfires. The top of the battery container and the push button lead retainers also are insulated. The dry cell batteries are housed in a moisture-resistant case. The firing plug is equipped with brass contact terminals. Lead wires are firmly held in the firing plug by spring-loaded retainers. When lead wires are inserted, and the firing plug pressed firmly into the battery container, a neon light glows at the top of the case to indicate a full charge in the capacitor. Release sends high volt-

age to detonate the charge. Mine Safety Appliance Co., Braddock, Thomas & Meade Sts., Pittsburgh 8, Pa.

## 21

### Hydraulic Puller

The OTC Power-Twin hydraulic puller has now been adapted for use with Owatonna 3-arm pullers. It is claimed that difficult pulling jobs requiring a three-arm puller can now be accomplished 75% faster and easier than with a screw-powered puller. Maintenance men who already have a Power-Twin ram and an OTC 3-arm grip-o-matic puller need only purchase a special 3-way head to convert the puller to hydraulic power. Three new heads are available for corresponding sizes of pullers. The 1013-2H and 1013½-2H heads adapt the 1013 and 1013½



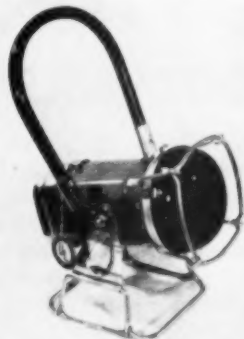
OTC Power-Twin Hydraulic Puller

pullers for use with the 17½ ton Power-Twin ram and the 1014-2H and 1015-2H adapt the 1014 and 1015 pullers for use with the 30 ton Power-Twin ram. Owatonna Tool Co., 417 Cedar St., Owatonna, Minn.

## 22

### Flashing Lanterns

A new safety red flashing lantern for use in all Class 1, Group D hazardous locations as well as other spots requiring a warning or marking light, has been introduced by the Justrite Manufacturing Co. This portable, battery-powered lan-



Model 2146-S Flashing Lantern

tern, Model 2146-S, houses a red lens and a sliding switch assembly controlling two bulbs. One position of the switch produces a steady red beam, which can be instantly changed to a flashing red light merely by moving the switch. Blinking power is stated to be good for in excess of 52 hours of continual operation. Justrite Manufacturing Co., 2061 N. Southport Ave., Chicago, Ill.

## 23

### Portable Electric Saw

A new, compact, portable electric saw, weighing only 10 lb., which makes all cuts in 2 in. dressed lumber at a 45° bevel cut has been announced by Cummins Industrials. The feature of this saw that makes for light weight and minimum bulk is its use of the Magic Pivot principle of putting the pivot point of the saw shaft closer to the saw shoe and the work. Another benefit claimed

# NO TIME LOST! LOADING OR LAYING ITS LOAD



A STANDARD STEEL  
PRESSURE DISTRIBUTOR  
GIVES EQUAL CIRCULATION THROUGHOUT  
THE SPRAY BAR FOR A  
UNIFORM SURFACE  
FROM CURB TO CURB  
FOR LONGER WEAR

## STANDARD STEEL PRESSURE DISTRIBUTOR

The Model 424 can be loaded in quick time for a "fast get-away". A two-way cleaning system guarantees a clean spray bar at the end of the day. First, the material is sucked out of the bar and back into the tank. Then by turning one small valve, cleaning solvent is released into pump and spray bar (without contaminating the asphalt in the tank). No time lost in tinkering—no time lost in loading—Standard Steel 424 keeps going all day long far ahead of the "gravel gang"

WRITE FOR CATALOG 424

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Maintenance Distributors, Tar Kettles, Patch Rollers, Supply Tanks, Tool Heaters, Asphalt Tools, Street Flushers, Construction Brooms.



Standard Steel Works NORTH KANSAS CITY, MO



# "MEALORUB" CRUDE NATURAL RUBBER IN CRUMBS

The only rubber that has proven its value in asphalt roads in use for about fifteen years

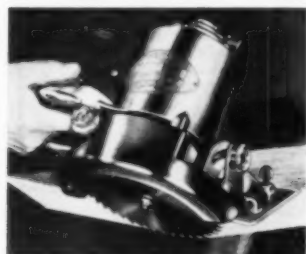
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For further information apply

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**120 Wall Street, New York 5, N. Y.**

*Representative for Indonesian Government Estates*



Maraw 700

for the Magic Pivot principle is the use of hard-biting, "stub-radius" blades,

which put more power at the cutting edge, reach farther through 2-in. dressed lumber at a 45° bevel cut and retain their cutting capacity longer after repeated sharpenings. Cummins Industrial, Division of Cummins-Chicago Corp., Chicago 40, Ill.

24

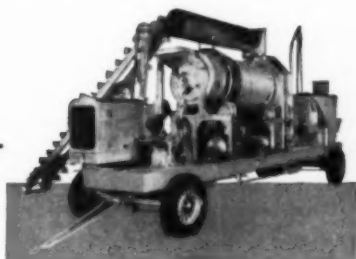
## Cup-Type Goggles

A new line of cup-type goggles has been introduced by Fendall Co. Included in the new goggle line are riveters, chipers, welders, and dust and splash goggles, which are said to incorporate many new features that provide the greatest possible degree of comfort to the wearer, plus absolute safety. Fendall Co., 4631 N. Western Ave., Chicago 25, Ill.

25

## Short Length Feature for Trucks

In response to demands of truck operators for a conventional-type truck tractor capable of hauling 35-ft. semi-trailers in states where 45 ft. is the overall length limit, the motor truck division of International Harvester Co. has introduced a new short-dimension feature into its line of conventional trucks. The feature is a 102-in. bumper-to-back-of-cab dimension, available on International truck models ranging in size from model L-185 to the six-wheel model LF-210. The new dimension represents a 6-in. reduction. The all-around visibility, riding comfort, and conveniences of International's Comfo-vision cab remain as before.



## Portable Asphalt Plants For City, State, Repairs and Small Contract Work

These 8-10 tons per hour Asphalt Plants economically repair almost any pavement. Asphalt, brick, concrete, macadam, can be resurfaced or patched. Alleys, driveways, sidewalks, industrial plants can be paved.

Produce for immediate hot laying, or for deferred cold patching. Match any bituminous surface.

Mixes at plant, including labor, fuel, and overhead, cost about \$4 per ton, with \$2 aggregate. Average 160 to 200 sq. yds. 1" thick per hour. A money-maker for small contract work.

Also larger plants, 15 and 30 tons per hour.

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Combining fuel and water storage with a Clayton 100 H.P. Steam Generator, this portable steam plant offers you the maximum in efficiency and economy of operation. MADSEN is the exclusive outlet for Clayton Steam Generators in the asphalt paving plant field. For asphalt heating and boiler firing this finely engineered piece of equipment is hard to beat. It can save you countless dollars in fuel costs, overtime maintenance and, because of its quick starting features, provides a flexibility to plant operation never before possible with the old-fashioned type boiler.

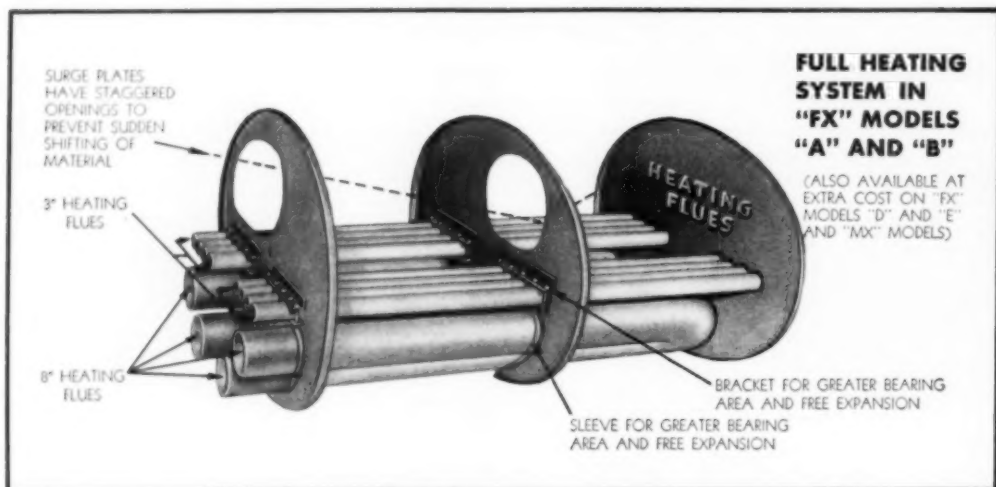


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# Etnyre offers you a Faster Heating System!



Etnyre "Black Toppers" with low pressure (atomizing-type) burners *heat faster* than any other distributors built today of the same capacity, with same cab-to-axle chassis, for these reasons:

1. Etnyre higher heat input — 12 to 13 gallons of fuel oil compared with 6 to 10 gallons for other units.
2. Larger heating flue area per gallon of material — due to a longer tank of smaller oval, made possible by locating the circulating system **BELOW** the tank instead of at one end of tank.
3. Larger flues per gallon of material burned, resulting in less restriction of combustion.

4. The Etnyre return line directs material forward at high velocity along hot flues causing rapid heat transfer from flues to material, more uniform temperature throughout load, and a reduction of carbon formation on flues. Compare this with taking material out of one end of tank and merely pouring it back in opposite end!

Get the facts — find out how Etnyre's pioneering experience results in a more economical, more dependable, more accurate distributor. Call nearby Etnyre Dealer, or make inquiry direct to...

**E. D. ETNYRE & CO.**  
**OREGON, ILLINOIS, U. S. A.**

**ETNYRE**  
**"Black-Topper"**  
BITUMINOUS DISTRIBUTORS



## Performance of Special Tires on Packed Snow Surfaces

*A Report of the 1951 Tire Test Project conducted by the National Safety Council's Committee on Winter Driving Hazards, National Safety Council, Highway Research Abstracts, March, 1952.*

The National Safety Council's Committee on Winter Driving Hazards conducted a two-week skidding and traction research project during the winter of 1950. The results of that project, which included stopping, traction, and cornering ability tests of 22 different tire designs, have been presented in the committee report entitled "A Comparison of the Effectiveness of Winterized and Mud-Snow Tires on Snow and Ice," published by the National Safety Council in 1950.

These tests were conducted on various surfaces including glare ice, rough-ice, and loosely packed snow, but because of unusual weather conditions it was not possible to secure a hard-packed snow surface. Since the latter is a rather common condition during the winter months, it was felt desirable to complete this project by testing a few representative tires on a hard-packed snow surface in conjunction with this year's test project.

Accordingly, stopping and traction ability tests were conducted during January and February 1951 on various hard-packed snow surfaces.

As in the previous year's tests, three separate classifications of specialized tires were considered. For purposes of this report, they are referred to as winterized, mud-snow, and winterized mud-snow tires.

On the basis of stopping and traction performance of specialized tires on the rear wheels only, as compared with natural rubber tires, the most important conclusions to be derived from these tests on packed snow are:

(1) Stopping distances with conventional tires on packed snow are about three times the normal stopping distance (21 ft.) on dry concrete. With the best of the specialized tires, packed-snow stopping distances are about  $2\frac{1}{2}$  times the dry concrete distance, and even with reinforced tire chains, stopping distances on packed snow are nearly twice that obtained on dry concrete.

(2) Winterized tires offer little advantage in stopping, averaging 5 per cent improvement over conventional-tread natural-rubber tires.

(3) Tires of the mud-snow type reduce stopping distances an average of 13 per cent compared to the natural rubber control tires.

## Can you use these **4 ADVANTAGES** of HERCULES Flattened Strand wire rope?

1. 10% Stronger
2. Proportionately Safer
3. Longer Lasting
4. Easier on Equipment

Have you experienced the extra advantages of Hercules' Flattened Strand wire rope?

Where properly applied, this exceptionally strong, durable rope produces amazing results. Some users report more than three times the service, compared with ordinary rope.

Hercules Flattened Strand packs more steel than any other construction. It spreads wear over four wires of each strand — not just one. It runs smoother. It lasts longer. It reduces groove wear. It increases safety factors in almost direct proportion to its extra strength.

*It will pay you to find out!*

Now, more than ever, the extra economy of Hercules Flattened Strand really pays off. Ask your Leschen wire rope specialist about it.

\*Reg. U.S. Pat. Off.

# LESCHEN WIRE ROPE



Flattened Strand • Non-Rotating • Slings  
Preformed • Round Strand • Locked Coil

A. Leschen & Sons Rope Co., St. Louis 12, Missouri.  
In business only to make wire rope —  
better wire rope — since 1857.

DISTRIBUTORS IN ALL PRINCIPAL CITIES

## Another reason why **BAKER** is the **BETTER** blade



Baker Blades are designed not only for peak flexibility, but for rigidity. With up to 12 inches of tilt available in five positions, the operator simply adjusts the frame at the trunnion brackets by shifting two pins. Also, adjustments are made on an arc movement which provide full bearing contact in all positions.

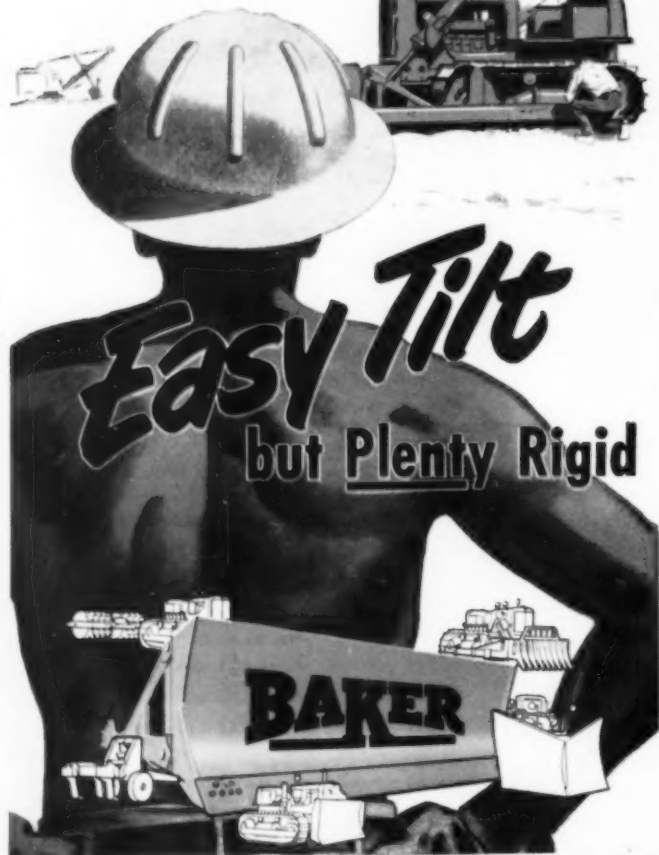
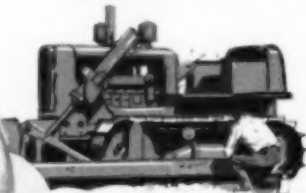
That's why owners and operators say Baker Blades will take a beating and stay solid—without developing "play" or shimmy.

The complete line of Baker Bulldozers, Gradebuilders and Root

Rippers—all easily interchangeable, too—is manufactured exclusively for Allis-Chalmers Crawler Tractors. Three mountings are available: engine-mounted hydraulic, frame-mounted hydraulic (the revolutionary 9-X "No Push Beam" Dozer) and cable-controlled types.

Call or write your Baker, A-C Dealer today—ask for proof why Baker is the better blade—dollar-wise—for you.

THE BAKER MANUFACTURING CO.  
Springfield, Illinois



**Baker—The most versatile line of tractor attachments**

(4) Winterized mud-snow tires show an average reduction in stopping distance of 17 per cent compared to the natural rubber control tires.

(5) Average traction ability of winterized tires is inferior to that of the natural rubber control tires.

(6) One of the tires of the mud-snow group shows an outstanding increase of 47 per cent in average traction ability over the natural rubber control tires, whereas the other shows an improvement of only one per cent.

(7) Both of the winterized mud-snow tires offer better average traction ability than the control tires, the group showing an average improvement of 19 per cent.

(8) Reinforced tire chains are far superior to the best of the tires tested both in stopping ability and traction ability, showing an improvement over natural rubber tires of 39 per cent in stopping ability and 273 per cent in average traction ability.

(9) Natural rubber tires are about 8 per cent superior to cold synthetic in stopping and 47 per cent better in average traction ability.

### President's Safety Conference Meets Oct. 17-18

An advisory committee of outstanding business and industrial executives is to be established by Commerce Secretary Charles Sawyer to examine the problem of the nation's high highway accident rate and to recommend measures for reducing it. As General Chairman of the President's Highway Safety Conference, to which he was appointed in April, Secretary Sawyer is calling a meeting of the Conference in Chicago on October 17 and 18. The representatives of his new advisory committee as well as officials and supporting groups from each of the 48 states will be invited to the Chicago conference.

Purpose of the October meetings will be to determine what progress has been made to date in the program backed by the Conference and to devise further means for getting the program more widely applied. The Conference has been supporting the following seven-point program:

(1) Adoption of the Uniform Vehicle Code and the Model Traffic Ordinance in the interest of uniformity in traffic laws and regulations.

(2) More effective collection and analysis of traffic-accident reports and use of these reports in guiding highway-safety activities.

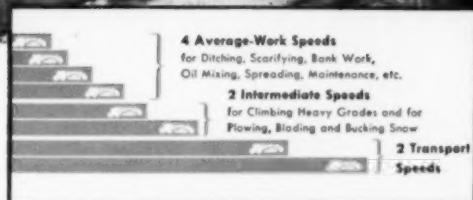
(3) The continuance of all American schools of traffic-safety programs to give guidance in accident prevention.

# "ADAMS High-Speed Performance Gives us Greater Production at Lower Cost" say Ellis, Kelly & Co.



© Ellis, Kelly & Co., Owensboro, Ky., will tell you, "We use our 100 H.P. Adams Motor Grader on all types of work—grading, ditching, banksloping, etc.—and prefer it on high-speed, heavy-duty work. Its 8 forward speeds enable us to work in the highest practical speed for the job at hand. On oil mix work the Adams is outstanding—mixing at speeds up to 8 mph. and laying as much as 8,000 feet in one day."

Here is convincing evidence that Adams Motor Graders do have the power, speed and stamina to handle all grading operations—better, faster and at lower cost. Ask your local Adams dealer for complete information on the model best suited to your needs.



## ADAMS 8 FORWARD SPEEDS

Adams Motor Graders give you 2 more forward speeds than several machines of similar size—8 forward speeds instead of 6. These additional speeds give you an extra working speed and a higher "high"—up to 25 mph. This means greater selectivity of speeds on all work—an exactly right speed for handling every job at the fastest practical rate... plus 30 to 50% faster job-to-job transport.

J. D. ADAMS MANUFACTURING CO. • INDIANAPOLIS, IND.

*Make your next  
motor grader an*





# DIETZ NIGHT WATCH LANTERN

Like a  
Miniature  
Lighthouse  
Beacon



For SAFETY — a WARNING LIGHT, seen from *any* angle near-by or from long distances, the NIGHT WATCH is without equal. Optically correct prisms concentrate the light into a vertical "Pencil Beam" of great intensity. Many exclusive features. Very economical to buy and to operate. Burns 100 hours on a pint of kerosene.

By the makers of Dietz Lanterns  
and Highway Torches

**R. E. DIETZ COMPANY**  
SYRACUSE 1, N. Y.

OVER A CENTURY AND A DECADE OF WORLD WIDE LEADERSHIP

(4) The operation of continuing traffic-law-enforcement programs in cities and states that will stimulate maximum voluntary observance of regulations by creating adequate deterrence to violators.

(5) Use of engineering principles and techniques to eliminate or reduce physical hazards and to promote the safe control of traffic movements.

(6) Adoption by the States of sound policies and procedures in the field of motor-vehicle administration, with special attention to driver licensing and vehicle inspection.

(7) Continuance of efforts by all public information media to spread the word about highway safety—and the lack of it—to the public.

## Turnpike Reports Sharp Drop in Accidents

The Pennsylvania Turnpike Commission's 1951 traffic accident report shows a marked decrease in fatalities and accidents in proportion to the traffic volume. The 1951 traveled mileage on the Turnpike increased 62.7% while the fatality rate decreased 31.5%.

Based on the standards approved by the National Safety Council which, for comparative purposes, uses a unit of 100 million vehicular miles of travel, the Turnpike's 1951 fatality rate was 8.5, compared to 12.4 in 1950.

There was also an encouraging 8.7% decrease in the rate of accidents involving injuries; a 4% decrease in the persons injured rate, and a 5% decrease in the rate of accidents involving property damage.

The year 1951 was the first full year of operation of the 260-mile Pennsylvania Turnpike System. The length of the system was increased another 67 miles in the latter part of 1951. The super-highway at present totals 327 miles.

The Turnpike Commission attributes the encouraging decrease in accidents and fatalities to more attentive and diligent efforts on the part of the police patrols, and to safety engineers, and drivers of commercial fleets. Passenger cars involved in fatal accidents during 1951 decreased by 12 per cent in comparison to the corresponding rate for 1950, while this figure was 33% for trucks.

Higgins Gets Certificate of Service. Neal Higgins, sales consultant for International Harvester Co., Chicago, Ill., has been awarded a Certificate of Service by the U. S. Department of Commerce for his work as director of the Construction Machinery Division of the National Production Authority.

Now—more than ever!

# smith the money-saving COMPRESSOR



smith MODEL 105-P

*Lower first cost!  
Lower upkeep!*

In high-cost times, look to the Smith for compressor savings! Delivers 105 cu. ft. per minute—combines heavy duty with light weight; easily portable. Powered with the Chrysler Ind. 15 Industrial engine — 6 cyl., 4" bore, 5" stroke, 377 cu. in., 3" crankshaft, 7 main bearings, sodium cooled valves and Stellite valve seats for heavy duty, long life. Compressor valves—stainless steel disc type with Manganese Bronze seats. Improved type pilot valve and simplified control . . . Write for literature and prices.

ALSO the new SMITH 70-P  
AIR COMPRESSOR

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# Transportation Congress

## Weights Factual Approach to Sound Highway Programming and Financing

A PANEL of papers on "Rating the Road Needs" was the high spot of the Fourth Annual Highway Transportation Congress, held May 6-8 at Washington, D.C. This symposium marked a strong new flavor in the over-all thinking among highway user groups, whose leaders see the scientific approach as a means of marshaling public and legislative support for more adequate road programs.

Meeting under the war-cry, "Get America out of the Traffic Muddle," the Congress under sponsorship of the National Highway Users Conference was keyed by Albert Bradley, N.H.U.C. chairman and executive vice-president of General Motors Corporation. Mr. Bradley told how thousands of miles of roads are being worn out, while less is spent for road construction and maintenance in actual dollar purchasing power than in the years before World War II when traffic was only half that of today. He urged that all revenues from highway taxation be applied to road construction in an effort to turn the tide on the deepening traffic muddle.

Speaking of the new "PAR" committee (reported on elsewhere in this issue) Mr. Bradley said a program was being formulated that is designed to get "action where action counts, which is in the local club, lodge or chamber of commerce, multiplied by thousands."

The joint responsibility of road users and public officials in preparing legislative highway programs was cited by Mrs. Julia Butler Hansen, of Washington state, a member of her state's House of Representatives and chairman of its committee on roads and bridges. Mrs. Hansen is also chairman of the Joint Fact Finding Committee on Highways, Streets and Bridges in Washington, and heads the Western Interstate Commerce Committee on Highway Policy of Eleven Western States. She told of the creation and working methods of the Joint Committee, which has made studies described as "the first long step toward legislative order and sound highway development" in Washington. This committee places emphasis on scientific factual research rather than on political juggling.

Among the results since 1940 she cited: engineering for the Columbia Basin; a merit system for state highway employees; classification of county roads and city street systems; uniform design standards for city streets and county roads; reciprocity between states; and the tax program which raised more than \$11,000,000 in the biennium.

The use of "Sufficiency Ratings," a scientific mechanism for measuring highway adequacy and thereby determining construction priorities among various road projects, was praised as a helpful factor in promoting public support of highway improvement programs. The panel meeting on "Rating the Road Needs" was led by Roy E. Jorgensen, engineering counsel of the N.H.U.C. Speakers included Carl E. Fritts, vice president, Automotive Safety Foundation; Walter W. Graf, city engineer of Lancaster, Ohio, and past president of the Ohio State Automobile Association; Frank N. Barker, chief highway engineer of the Illinois Division of Highways; and O. L. Kipp, deputy commissioner and chief engineer, Minnesota Department of Highways.

Mr. Jorgensen noted that the sufficiency rating idea was developed by Karl Moskowitz about six years ago while he was employed by the U. S. Bureau of Public Roads in Arizona. It is now used in about 20 states and by the U. S. Bureau of Public Roads. A special subcommittee of A.A.S.H.O., charged with setting up a continuing inventory of highway needs on the Federal-aid highway systems throughout the country, has adopted the sufficiency rating procedure and recommended its use by all the states.

Mr. Graf described the sufficiency rating technique as "one of the most important highway engineering tools developed in recent years in checking which of our existing roads most need improvement." He warned, however, against the "tendency toward believing that the sufficiency rating will accomplish more than it was ever intended to accomplish," and against "any misconception that sufficiency ratings are a new panacea to the



★ Conferring at the Congress: Arthur C. Butler, Director of the National Highway Users Conference; Albert Bradley, Executive Vice President of General Motors and NHUC Chairman; and A. W. Koehler, Secretary-Manager of the National Association of Motor Bus Operators

★ "PAR Meets the Press" was a feature of the Transportation Congress. A panel of well-known press representatives, including Martha Rountree and Lawrence Spivak, originators of the "Meet the Press" radio and television show, are shown quizzing four highway transportation experts.





# New Report Released on Maryland Test Road

A 5,000 word summary on the Maryland Test Road One-MD was issued by the Highway Research Board May 9. This summary which will be followed by a final report about July 1, contains 28 conclusions on the behavior of the test pavement, each finding being "borne out conclusively by the scientific data taken during the test."

The test which was conducted by the Board on behalf of eleven eastern state highway departments, the D. of C. and the Bureau of Public Roads, utilized trucks supplied by 7 manufacturers, and gasoline, oil and lubricants supplied by 15 companies affiliated with the American Petroleum Institute.

The test's purpose was to determine the relative effects of four different axle loads on a concrete pavement. The loads employed were 18,000 and 22,400 lb. on single axles, and 32,000 lb. and 44,800 lb. on tandem axles. A 1.1-mile section of reinforced concrete pavement 24 ft. wide with 9-7-9-in. parabolic cross-section subgrade was selected to represent as nearly typical soil conditions as possible, the test site being on U.S. 301 in Maryland. The pavement had seen 9 years of service and according to studies was adequate for the support of about 100 passages per day of loads in the 10,000 to 18,000 lb. range, including periods of reduced subgrade support.

On one half of the test road, 18,000-lb. axle loads were passed in

both directions over one lane, and 22,400-lb. loads over the opposite lane, the frequency of passes averaging 1,324 daily. The axle load was the only major variable between the sides. Based on all types of subgrades the 22,400 lb. single axle loads caused 6.4 times as much cracking (1,269 vs. 196 lin. ft.) as the 18,000-lb. single axle load after 238,000 truck applications.

On the other half of the test road, 32,000-lb. tandem axle loads were passed over one lane and 44,800-lb. loads over the other, the difference in load again being the principal variable between sides. The test runs for these loads were discontinued October 13, 1950, when cracking under the heavier load was progressing very rapidly. Based on all types of subgrades the 44,800-lb. tandem-axle loads caused 12.3 times as much cracking (3,704 vs. 302 lin. ft.) as the 32,000-lb. tandem loads. Loads averaged 918 daily, and each lane was subjected to about 92,000 applications.

The foregoing outline of only a few of the twenty-eight findings doesn't give a complete and balanced picture of the test data, which should be studied in detail by anyone interested. A copy of the complete report is available on request to the Highway Research Board, 2101 Constitution Ave., Washington 25, D.C.

The report had been out only a few hours when reactions began to be expressed. According to an Associated

highway problem."

Mr. Fritts told the gathering that "the sufficiency rating idea becomes a most effective corollary to other phases (of measuring road needs) and fills a long-standing gap in the process. Its development is particularly useful in helping to determine what should be considered first in the improvement of our important rural highways." Although the sufficiency rating system, according to Mr. Fritts, "does only one part of the total job of rating the road needs, we welcome any device . . . which in the end contributes to the solidarity of the method of appraisal of need for highway improvement."

Mr. Barker said his state of Illinois "does not need to be sold on the employment of sufficiency ratings. Although a recent statute requires that

the projects in our published annual programs be listed 'in order of relative urgency'," he declared, "we would be using the rating system even if this legal requirement did not exist. We consider it an invaluable administrative tool."

Mr. Kipp revealed that studies made during the past year by the Subcommittee on Sufficiency Rating Formulas of the Highway Research Board Committee on Highway Costs had stimulated efforts which have led to the development of a sufficiency rating procedure in Minnesota. Minnesota is now ready to begin a pilot study, he said, "to determine the validity of the weighing of the several factors tentatively established." These factors will include, Mr. Kipp said, the structural capacity, traffic capacity, maintenance cost and accident rating.

Press news release, T. J. Kauer, Ohio highway director, was reported as saying that the test findings might lead to a reduction in the truck weight limits in Ohio. He was reported to have characterized the test as "the first scientific evidence that heavy loads crack highways." Kauer who is a member of the executive committee of the 11-state group initiating the research, planned a state meeting to study the data and draw conclusions for possible limitation of Ohio truck loads. The technical data will be given Ohio highway design engineers to incorporate in future highway planning, he said. For the moment the state will continue to design roads for the legal axle load limit which is 19,000 lb. for a single axle and 31,500 lb. for a tandem rear axle.

## Truckers Defend Concrete

Following release of the Maryland data the American Trucking Association declared that the LaPlata, Md., road tests, directed by the Highway Research Board, have shown that "properly maintained concrete roadways laid over a suitable base can carry heavy loadings without damage."

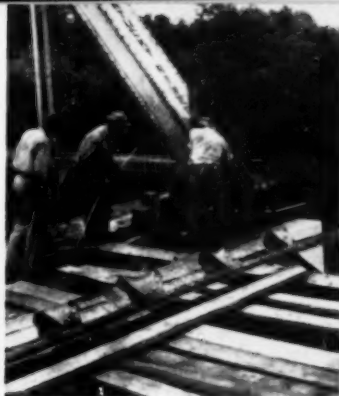
John V. Lawrence, association managing director, said engineers in charge withheld proper maintenance in order to make the road crack and that soil conditions under lanes carrying heaviest loadings were poor.

Officials of the Highway Research Board replied their previously announced findings that heavier loaded trucks caused more cracking on the test strips than lighter ones were not challenged by the association statement. This somewhat misleading statement said the lanes carrying light and heavy loads were given the same amount of "limited" maintenance and that comparisons were made between light and heavy load lanes according to parallel soil conditions.

The Trucking Association was on the advisory committee supervising the test, but has criticized the study several times since it began in June, 1950. The Maryland test was sponsored by several eastern highway departments in cooperation with the Bureau of Public Roads to learn more about the effects of truck weights on highways.

**Whelan Named District Sales Representative.** Joseph D. Whelan has been appointed new district sales representative for W. A. Riddell Corporation, Bucyrus, O., in the western United States and British Columbia. His headquarters will be in California. 5-52





★ Scenes during the bridge widening job at Frankfort, Kentucky. Note how truss to be moved was supported on a line of rails at each end; and how pier tops were remodeled with reinforced concrete

## Old Bridge Split in Half for Widening

**C**UTTING the trusses of an old bridge apart and spreading them out to provide a wider deck is not exactly a new trick, but each such job requires considerable ingenuity.

Latest example of this method of bridge modernization to come to our attention is a project for widening and modernizing a bridge over the Kentucky River at Frankfort. Harry O. Wyse, of Lexington, was the contractor.

The old bridge, originally built for railroad use, consists of one 38 ft. deck girder span, three 83 ft. deck girder spans, a 169 ft. through truss span over the main channel, and a 47 ft. deck girder span on the opposite approach. The old structure provided a 14 ft. roadway width which accommodated an antiquated timber surface and narrow sidewalk until recently.

The modernization was designed to widen the roadway to 20 ft. and provides a portland cement concrete pavement, concrete sidewalk, and improved approaches surfaced with bituminous concrete.

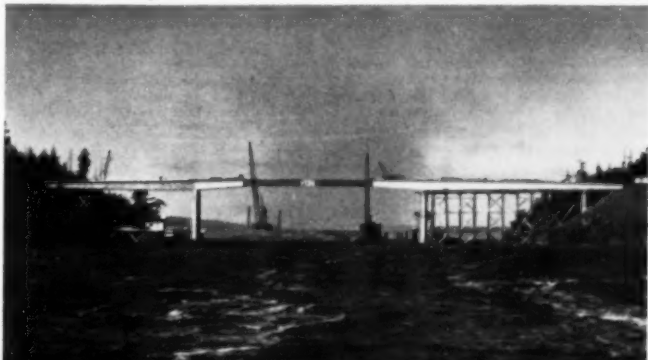
Spreading out the girders on the deck girder spans involved little difficulty, but moving one truss for the through span was quite another problem. Work on the large truss span was complicated by the nearness of a parallel steel truss bridge carrying the L & N railroad; the railroad denied contractor permission to anchor the top of the adjacent or up-river truss to that structure.

To keep the nearest or up-river truss plumb during his operations, the contractor used new replacement steel to fashion temporary knee braces, which he welded to the old deck girders and fastened about  $\frac{1}{2}$  of the way

up the truss. He then built push turn-buckles across the top to keep the down river truss plumb during the work of moving it by a jacking operation.

The down-river truss was then supported on greased sections of railroad rails and cut loose as the first step in the widening. Each truss was estimated to weigh about 90 tons; the contractor planned the work so that one ratchet jack at each end would handle 45 tons without overloading. The entire truss was inched downstream a total distance of 8 ft., with a steel worker aloft at each of several push-buckles working to keep the structure plumb. Jacking the truss and anchoring it in new position required only nine hours. The remainder of the job was routine, consisting of bracing and constructing the floor. The contract for \$227,000 included 261,500 lb. of new steel, 97,540 lb. of reinforcing, 675 cu. yd. of Class A concrete for deck paving, a small amount of wet stone masonry removed and concrete masonry replacement for widening piers and abutments.

★ Setting completed for the central steel girder section for the Port Townsend highway bridge



### 670 Foot Box Girder Bridge Completed

Published here is a photograph of the completed structure for the 670 ft. long concrete and steel highway bridge across the Port Townsend shipping canal in Washington.

This structure together with smaller structures of similar design was described in *MAY ROADS AND STREETS* in the article "Welded Steel Box Girders Used for Three Bridges in Washington."

This article we regret failed to clearly indicate that the 140 ft. steel span and related structure (here pictured) is part of the program of Jefferson County, Washington, for which Keith F. Jones, is County Engineer.

The 140 ft. steel box girder section is part of a 250 ft. central span the side cantilevered portions of which are reinforced concrete boxes. The total cost of the structure is reported to be approximately \$17 per square foot of roadway.

## New Reference on Soil Engineering

"Soil Engineering," by Merlin G. Spangler, Research Professor of Civil Engineering, Iowa State College, Ames, Iowa. 458 pages, 6 in. by 9 in., hard cloth binding. Published by International Textbook Company, Scranton, Pennsylvania. Price \$6.50. Review by Col. V. J. Brown, Director, CAMINOS Y CALLES, and Editor, COUNTY AND TOWNSHIP ROADS.

It was with extreme pleasure that I read "Merl" Spangler's book, "Soil Engineering." Having known him through the years and while as a student, working his way through college, I can testify to the thoroughness of his thinking and the integrity of his statements. I also know of his many years of scientific approach and analysis to problems assigned to or selected by him. Having dabbled myself, superficially, in the subject of soil mechanics through the years, I marvel at the thorough treatment of the employment of soils as an engineering material, which Merl has included in this book.

Extremely useful information in this text are the statements, in general in chapter subheads, of the underlying premises, assumptions, or common practices of engineers regarding each of the subjects. It is upon these premises and the results of calculations or empirical data, that theories are developed and formulas worked out.

The problems included in each chapter are distinctly advantageous in pressing home the context of the chapter.

This reviewer misses a compiled list of symbols and nomenclature. True, each symbol is explained when first introduced, but one forgets the meaning when a symbol appears at a later place in the book.

CHAPTER 1—Introduction—explains the historical background of soil engineering and, so far as I know, is the first time anyone explained the works of Strahan, U.S. Department of Agriculture, Marston, Atterberg, Terzaghi, and Proctor in one publication as they relate to this subject.

CHAPTER 2—The Origin and Nature of Soils—is an explanation of the various soil formations as classified geologically. For engineering purposes, the word soil refers to all of the unconsolidated mineral material at or near the earth's surface, plus the air, water, organic matter and other substances which may be included therein. It is not synonymous with the agronomists' soil, nor does it include bedrock.

CHAPTER 3—The Soil Profile—cata-

logues soils by the pedological classification and describes the series, types, and type phases. The zonal, intrazonal and azonal groups are described. A clear definition of what is meant by the siliceousquioxide ratio is included.

CHAPTER 4—Soil Structure and Texture—discusses the terminology frequently used in classifying a soil for recognition by its textural and particle arrangement characteristics. Use of the equilateral and the right triangle diagrams is explained.

CHAPTER 5—Soil Density—discusses the engineering value of density of soil, the reasons for obtaining it, how to calculate it, and the effect of optimum moisture content. This reviewer would like to have seen some discussion on the relationship between density and bearing values in this chapter and some references to plate bearing tests and density. The statement is made, "and to increase the strength of the soil in bearing," without showing any mathematical relationships between density and allowable bearing values. This is not so much a shortcoming in this book as it is a shortcoming in the field of engineering as a whole. Technically, how does the engineer know how much density to require in a pavement base to support a specified load per square foot?

CHAPTER 6—Soil Surveying and Sampling—tells how to make reconnaissance and detailed soil surveys and how samples are taken. Each sampler must have an individual technique worked out for that tool.

CHAPTER 7—Soil Water—exhibits concepts of the location of a water table and describes what is meant by hygroscopic, capillary, and gravitational water.

CHAPTER 8—Hygroscopic Moisture and the Colloidal Fraction—discusses the action of moisture on very finely divided colloidal matter. What a colloid is and the theory of how ions function are explained. Lattice diagrams of clay minerals are included.

CHAPTER 9—Capillary Water—delves into the theory of surface tension, capillary potential, flow of moisture in soil, and the effects of various factors such as temperature, dissolved salts, existing moisture content, grain size, soil packing, and angle of contact. Sorption curves are thoroughly discussed. Basic, of course, is the location of the water table.

CHAPTER 10—Gravitational Water and Seepage—is a detailed discussion of various methods, with equations, for measuring the flow of ground water through soil pores. Percolation and permeability are analyzed clearly. A table of permeability values would have been useful.

CHAPTER 11—Flow Nets and Seepage Forces—discusses the general characteristics of flow nets and the manner in which they are used in seepage problems. The author states that the presentation of the definitely mathematical relationships of flow nets is without the scope

of his subject. This is followed by analytical presentations of forces acting on soil particles in seepage conditions and under head of water. Quicksand, sand boils, effective stress on a soil particle, and pore pressure are discussed.

CHAPTER 12—Soil-Water Consistency—explains the Atterberg Limits characteristics of soils, shrinkage properties, and Proctor's density, and tells what is the significance of each test.

CHAPTER 13—Engineering Soil Classification—discusses the systems which have been set up by various engineers or groups to serve as a language by which one engineer may convey to another the engineering properties of a soil under discussion. The systems discussed are the parent A-1 to A-8 system of the Bureau of Public Roads with the later modifications, the Casagrande-Army Engineers system called the "Airfield Classification System," and the Civil Aeronautics Administration system which uses the E-1 to E-13 groups.

CHAPTER 14—Frost Action in Soils—is a discussion about frost heave, frost boils, and permafrost, and methods of contending them.

CHAPTER 15—Granular Soil Stabilization—treats of mechanical gradation stabilization using local aggregates or soils and mixing them in proper proportions. Methods of calculating mixture percentages are explained and illustrated by example.

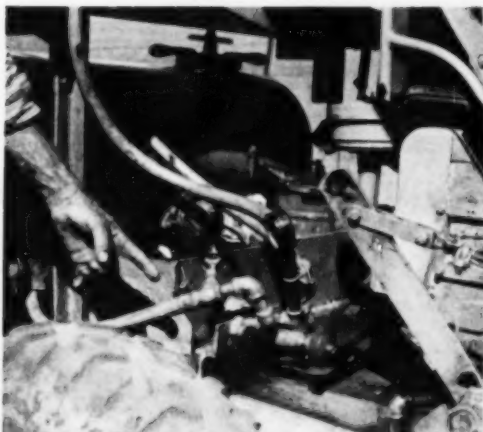
CHAPTER 16—Thickness of Flexible Pavements—begins by presenting a rational approach to design thickness of a pavement but includes two reasons why this approach cannot be used as yet. Then follows empirical methods: CBR, CCA, Minnesota, and Colorado.

CHAPTER 17—Stress Distribution in Soil—is an explanation of Boussinesq's solution of stresses in a semi-infinite elastic medium as applied to soil and foundation problems. Tables and curves necessary to solve practical problems are included.

CHAPTER 18—Consolidation and Settlement of Structures—discusses Terzaghi's theory of soil consolidation (not compaction) explaining the step by step application of various formulas involved, first discussing each formula. The closing pages of the chapter establish a problem which is solved by using the theory and formulas. The procedure is laborious even without attempting the derivation of the formulas.

CHAPTER 19—Shearing Resistance and Strength—explains the simple physical property of resistance to sliding of an object on an inclined plane as the basic understanding of shear in terms of shear values, normal values and angle of friction. From this it shows how shear tests are made and interpreted with both simple shear apparatus and triaxial shear equipment. The Mohr diagram is thoroughly explained. The chapter concludes with a discussion on critical density and critical void ratio of sand.

CHAPTER 20—Stability of Slopes—shows how shear stress and shear



★ Spray equipment for weed control gives double duty to this mower. Note hose clamped on frame. Also water storage tank mounted to rear of operator's seat. Finger points to water pressure pump auxiliary motor in foreground. U.S. Bureau of Public Roads Photo

## Special Mower-Mounted Weed Sprayer Proves Successful

**A**N ingenious weed spraying attachment has been constructed and installed on a conventional highway tractor mower by a South Dakota state highway maintenance man, Jack Al-

den, Maintenance Foreman, Faith, S.D. An oil pump from a 1938 model truck, converted to a pressure water pump, is driven with a V-belt from the auxiliary motor of the highway tractor mower. The V-belt attaches to a pulley on the auxiliary motor drive shaft on the opposite end to that which drives the mower sickle bar. The pump develops up to 120 lb. per square inch pressure and a pressure gage is mounted on the line. A globe valve is installed on the line between the gage and the supply tank to regulate the pressure.

The connections between the pressure pump and the storage tank and between the storage tank and the nozzle are made of  $\frac{1}{4}$  in. diameter rubber hose similar to the type used to connect hot water auto heaters. The 40 gallon capacity water storage tank is mounted in back of the operator's seat.

Two nozzles, one is a spray type and one is a jet type, are provided on the same mount and may be readily interchanged. The spray type nozzle is used for those stretches of right-of-way in which a continuous area is in need of spraying. This nozzle will spray an area 17 ft. wide and the 40 gal. storage tank is sufficient to spray a strip  $3\frac{1}{4}$  miles long, or a total of a little more than seven acres. A 350-gal. tank mounted on a light truck accompanies

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the mower-spraying machine when considerable spraying, away from a convenient water supply, is contemplated. The jet-type nozzle is used to spot spray weed patches encountered during normal mowing operations, and as a means of extinguishing grass fires. The jet nozzle is effective in putting out grass fires as it throws a small but forceful stream a distance of up to 40 ft.

While this is a "homemade" experimental type of unit, it has proven its worth in this sparsely settled grass country in which operators often must work a comparatively long distance away from field headquarters. During the regular weed mowing operation, spraying of small patches of noxious roadside weeds is made feasible with this machine. By destroying these weeds before they reseed large scale spraying with a regular spraying machine is unnecessary.

Leo A. Ihli is Maintenance Engineer of the South Dakota State Highway Commission.

**Universal Atlas Appointment.** F. P. Diener, chemical engineer of Universal Atlas Cement Co., New York, N. Y., has been appointed director of tests and research.

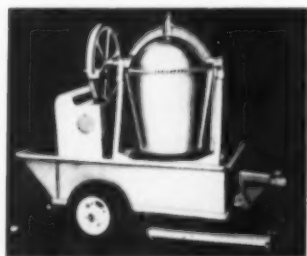
**Reilly Tar Appointment.** Robert J. La Fortune has been appointed representative by Reilly Tar & Chemical Corp., Indianapolis, Ind., in the Oklahoma, Arkansas and Colorado territory for protective coatings, creosote, oil and roofing pitch.

**Bachman Promoted by Worthington.** John S. Bachman, heretofore assistant manager of the Construction Equipment Division of Worthington Corporation, has been promoted to manager of paver and portable mixer sales, at the corporation's Plainfield, N. J. works.

## Equipment and Material Notes

### 26 Concrete Mixer

A new 3 cu. ft. concrete mixer announced by the Wright Engineering and Supply Co. has its bowl, pulley wheel, yoke and end bearing castings made of aluminum alloy. The mixer weighs 147 lb. The drum, made of 16 gauge steel, is machine rolled and flanged to the bowl in a continuous rivetless joint and turns on a true-centered, cold rolled steel shaft.



Wright Portable Mixer, Model 3RBG

The entire unit is mounted on an electrically welded framework of rugged steel angle with reinforcing gusset plates. The mixing is accomplished by four paddles—two in the middle of the drum and two at the back near the bowl. Interchangeable paddles incorporated in the mixer allow the machine to be used for mixing plaster and mortar as well as concrete. A trailer and steel mortar box for the mixer are available. Wright Engineering and Supply Co., 1304 South Bannock St., Denver 10, Colo.

### 27 Fork Lift Trucks

Two models have been added to the new line of fork lift trucks of The Buda Co. Rated at 3,000 lb. capacity at a 15 in. load center, the two new models are modernly styled with all parts being completely functional and combining the features of safety, visibility and eye-appeal. Model FT30-15 is powered by Buda's four cylinder, 49 h.p. gasoline engine model 4-B-153. Model FTD30-15 is powered by a Buda diesel engine of

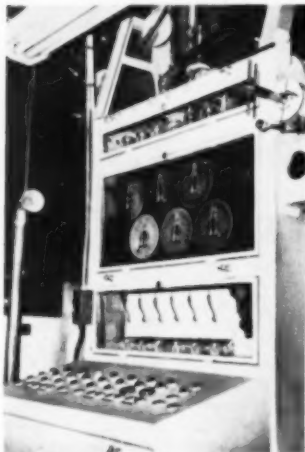


Model FT30-15 Lift Truck

identical cubic inch displacement, bore, stroke and mounting dimensions resulting in more economy, longer engine life and increased safety. Buda model FT30-15 and diesel powered model FTD30-15 are available in five standard masts with a 72 in., 84 in., 108 in., 114 in. and 120 in. lift. The Buda Co., Harvey, Ill.

### 28 Repeater for Automatic Re-Batching

To increase the efficiency of transit mix and central mix concrete operations, a push bottom control panel that automatically produces 24 different size and type batches of aggregate and cement has been developed by C. S. Johnson Co., a subsidiary of Koehring Co. The new, automatic mix selection mechanism is electrically controlled and is installed under the Johnson multiple compartment aggregate and cement bin. Fully automatic single material batchers on each compartment are controlled by the central

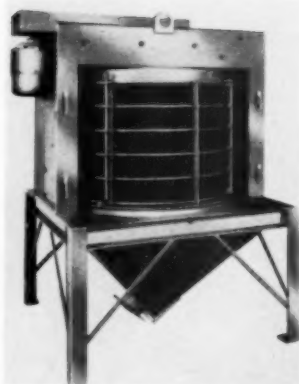


Control Panel

dial scale unit with pen recording of the weight of each single material batch. A water batcher and a cement batcher that provides for automatic moisture compensation completes the setup. A dial on the 24 mix selector panel provides for 2500-lb. or 3000-lb. (per sq. in.) concrete in 1/2, 3/4 and 1 yd. batches. On each size batch there are four individual selections for 3, 4, 5 or 6 in. slumps. This makes it easy to change from one type of batch to another as needed. The "repeater" adds additional flexibility by automatically providing for rebatching of the initial batch 1, 2, or more times to make up the full mixer charge. The operator simply sets the mix selector, sets the "repeater," pushes the "start" button and the plant weighs out batches fast and accurately. C. S. Johnson Co., Champaign, Ill.

### 29 V Screen

A new high capacity V screen for sharp separation of wet and dry materials from 4 mesh to the very fine meshes, announced by Nordberg Manufacturing Co., combines a centrifugal action stated to be the equivalent of five times the force of gravity with a gyratory movement. This

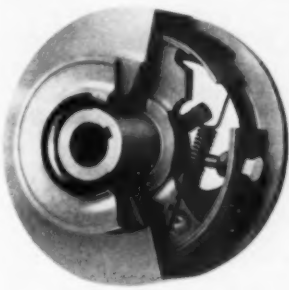


Symons V Screen

cylindrical screen, mounted vertically, is presently manufactured in one size, 3 ft. high and 12 ft. in circumference resulting in 36 sq. ft. of screening surface. A cupped feed plate with radial vanes sets a little below the upper edge of the drum. Material to be screen enters through an opening in the top of the frame and is impinged by the feed plate against the inner surface of the drum. The oversize particles are held against the screen for a brief interval with the fines passing through. Using 14 gyrations to one drum rotation, each gyration of the drum produces an inward deflection of the material being screened. This frees the holes in the screening surface for the passage of undersize at the next contact and permits the material to drop a short distance. This process is repeated in a similar manner until the particle either goes through the cloth or is discharged as oversize. Nordberg Manufacturing Co., Milwaukee 1, Wis.

### 30 Automatic Clutch

A lightweight, compact, automatic, centrifugal clutch for all standard engines from 1/2 to 10 horsepower is being produced by Farm Easy Products, Inc. This new clutch engages and disengages at adjustable engine speeds, ranging from 600 to 1,500 r.p.m. Two set screws easily attach it to motors used to power portable saws and mowers, grain elevators, conveyors, cement mixers and vibrators, winches, garden tractors, pumps and standby power units. According to the maker it can be attached to any standard,



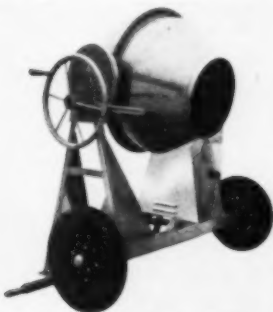
Farm Easy Clutch



American made, air-cooled four-cycle gasoline engine. The clutch has less than a dozen parts. It is operated by centrifugal force, which expands and engages the clutch band at the desired "cut-in" speed. This "cut-in" speed is adjusted by moving the band tension spring, increasing or decreasing the tension holding the clutch band out of engagement. Farm Easy Products, Inc., 1208 East Centennial Ave., Muncie, Ind.

### 31 Concrete Mixer

A new 3½ cu. ft. end discharge mixer with a high quality semi-steel, cast drum and yoke has been announced by Gilson Brothers Co. The new mixer features a ring gear integrally cast with the load balanced drum for better alignment and smoother operation. Drum drive shaft

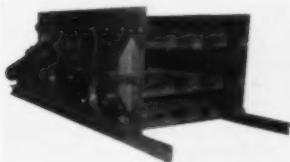


Morspeed Econo-Master

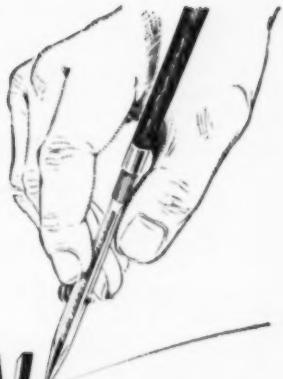
and yoke are both mounted on Timken roller bearings. Charging and discharging is made easier by a geared tilting mechanism and friction brake lever which locks the drum at any desired position in its complete swing. Power and drive are provided by an air-cooled gas engine and roller chain on machine cut, steel sprockets. Gilson Brothers Co., 20 W. Gilson St., Fredonia, Wis.

### 32 Vibrating Screens

Expansion of its vibrating screen line to include a larger variety of single, double and triple-deck screens has been announced by Kolman Manufacturing Co. The Series "C" screens feature a more compact design than former models which, with more rugged construction throughout, enables them to be made in larger sizes. The Kolman spring design allows full freedom of vibrating movement and absorbs vibrations so they are not transmitted to attached equipment. Heavy duty springs and bearings are used for long service; parabolic design of all decks utilizes all space for maximum capacities. Stock models of these 2, 2½ and 3-deck screens include sizes from



Series C Screen



**VIBER**  
*Leadership starts on the drawing board...*

where new products are constantly being developed to furnish you a complete line of superior vibration equipment.

*and is proved in the field...* where greater performance, more years of efficient work at low cost operation have made Viber standard equipment with leading contractors throughout the world.

Please write for Viber's new illustrated catalog on its standardized line and new products.



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Concrete Vibrators Since 1931

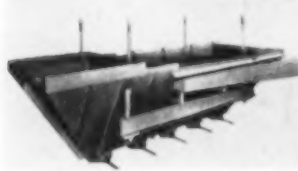
Dept. 61, 726 South Flower Street • Burbank, California



4 to 10 ft. long and from 2 to 4 ft. wide. Kolman Manufacturing Co., 5860 W. 12th St., Sioux Falls, S. Dak.

### 33 Bleeding Valves for Scalping Tanks

Automatic bleeder valves are now available with the water scalping tanks of Eagle Iron Works. To eliminate the need for continual manual operation of adjustable bleeder gates or valves and to insure discharge of maximum solids, at all times, to fine material washers (or multiple units), a self-operating valve, has been developed by Eagle. This valve



Eagle Water Scalping Tank with Automatic Bleeding Valve

opens when sufficient sand has settled within the tank. As the level of sand in water scalping tank drops, the valve closes—at least partially—to permit sand to build up. Weight of sand which settles on actuator plate counter-balances force of adjustable spring, thus the opening valve. Height of the actuator plate is adjustable. Another recent development is rotating spouts, now available, on the discharge openings of the water scalping tanks. These are used with a divided collecting-blending flume, below the tank, part of the product being diverted to an Eagle coarse sand washer and part to a fine sand washer. Eagle Iron Works, Des Moines, Ia.

### 34 Surveying Instruments for Contractors

A new line of moderate-priced surveying instruments, specifically designed to fill the needs of contractors and builders, has been introduced by C. L. Berger & Sons, Inc. Four instruments make up the new "N" line: a convertible transit-level, heavy duty 12 in. dumpy level, service transit-level (farm level) and a hand level, specially designed for preliminary surveys, construction work and road

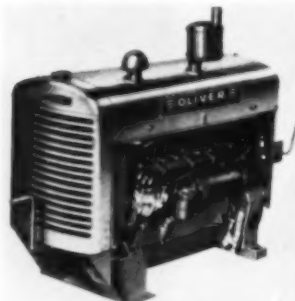


New Berger Convertible Transit-Level

building. The new instruments are constructed of brass and bronze, the same materials used in Berger transits, levels, theodolites and alidades. The design of the "N" line instruments has been simplified, however, to combine rugged construction, ease of use in the field and moderate cost, with the degree of precision required by contractors' and builders' applications. A descriptive booklet giving complete specifications on the "N" line is available on request to C. L. Berger & Sons, Inc., 37 Williams St., Boston 19, Mass.

### 35 Power Units

A new and heavier series of power units developing 73 h.p. has been added to the stationary power unit line of The Oliver Corporation. The new series is called the 199. Like the other units in the series, the 199 engines are available for gasoline and diesel fuels, and engineering development is now being com-



The Oliver Series 199 Power Unit

pleted for LP gas. The 199 is a 6-cylinder engine and features overhead valves, replaceable cylinder liners, and other design and engineering characteristics which have proved valuable in extending the life of tractor and power unit service. The engine has a 4 in. bore, a 4 in. stroke, and a displacement of 302 cu. in. Maximum continuous duty r.p.m. is 1,800, with intermittent duty at 2,000 r.p.m. and a governed speed range from 1,200 to 2,000 r.p.m. with close governor regulation. The Oliver Corporation, 400 West Madison St., Chicago 6, Ill.

### 36 Stripping Shovel

Several models of the new hi-lift stripping shovel, recently introduced by Koehring Co., are now working in various sections of the country. Using the same base machine as the standard 2½ cu yd. Model 1005, the hi-lift stripper operates with a 50 ft. boom and 36 ft. dipper stick. This attachment allows a maximum dumping height of 40 ft. and a reach of 60 ft. with boom angle at 45 degrees. Features of the new hi-lift design include a single dipper stick with cable crowd and a twin box section boom structure for maximum strength and minimum weight. Unusually large sheaves are employed throughout to prolong cable life. In addition, the 1005 hi-lift can be converted for lift crane, dragline or clamshell operation. The standard 60 ft. crane boom, with a rated lifting capacity of 7½ tons, can be increased to a maximum allowable 150 ft., including a 30 ft. boom jib. It will handle dragline buckets of 2½ to 4 cu.



Koehring Hi-Lift Stripping Shovel

yd. capacity or clamshell buckets of 3 to 4 cu. yd. Total weight of the machine as a stripper shovel is approximately 204,000 lb. Koehring Co., Milwaukee 16, Wis.

### 37 Plaster-Mortar Mixer

A new 3-P tilting plaster-mortar mixer of 3 to 4 cu. ft. capacity is now in production by Kwik-Mix Co., a subsidiary of the Koehring Co. Features claimed for the compact unit are portability, low charging height, wide base tires, end-to-end



Model 3-P Plaster-Mortar Mixer

mixing action and a simple declutching system for fast engine starting. The mixer has a width of 29 in. and a 37 in. shoveling height. The mixer is fitted with four non-clogging saw tooth blades. Anti-friction bearings on the counter-shaft and paddle shaft are lifetime lubricated. The sturdy mixing drum can be tilted in either direction for quick cleaning. Power is transmitted by multiple V-belts from a standard make 3 h.p. air cooled engine. Kwik-Mix Co., Port Washington, Wis.

### 38 Automatic Welder

A new, completely automatic welder and re-surfacing unit, stated to be capable of fast, low cost reclamation of track links, rolls, idlers, sheaves, etc., has been introduced by the Penn Tool & Machine Co. Called ConSERVall by the manufacturer, the unit automatically welds or re-surfaces (apply an overlay) any part or workpiece requiring a horizontal pass. With the addition of a power driven, variable rotation speed rotator, the unit will re-surface any circular work, such as rolls, idlers, sheaves, etc. Complete tracks are placed in the ConSERVall trough and re-surfaced in a comparatively short time. Welding length and space between welds are automatically controlled and indexed

by cams which are quickly and easily adjusted to handle any type track. The resurfacing operation is done by the submerged method. No flash is visible at any time. Edward M. Paff, Ross Llewellyn, Inc., 228 N. LaSalle St., Chicago 1, Ill.

39

#### Road Sweeping Magnet

A new line of road sweeping magnets for picking up nails and tramp iron has been announced by The Ohio Electric Manufacturing Co. Of sturdy fabricated steel construction, the magnets are light in weight and have special eyelets for attaching the magnet to the truss type



Ohio Road Sweeping Magnet

structure on the front of the truck or Jeep. In most installations, the magnet supporting structure can be raised or lowered from the driver's position. A portable, gasoline-driven generator energizes the magnet controller and both units are mounted in the truck. The magnet "On-Off" switch is located on the vehicle instrument panel. The magnets are made in a number of different lengths for single or multiple magnet installations. The Ohio Electric Mfg. Co., 5900 Maurice Ave., Cleveland, O.

40

#### Excavator and Truck Crane

A new Gar Wood 75 standard and heavy duty  $\frac{3}{4}$  yd. excavator and 20-ton truck crane, featuring power actuated drum clutches, direct right angle drive, optional hydraulic coupling and the new foundation borer attachment, has been announced by the Findlay Division, Gar Wood Industries, Inc. Operated by direct, extra-sensitive manual controls, the Gar Wood uses the engine's power to engage



Gar Wood 75 Excavator



Here's one contractor who did! As an example of the advantages inherent in MICHIGAN Truck Cranes, Mr. Gurtzweiler of Henry Gurtzweiler, Inc., Toledo, cited a competitive-bid job.

Other contractors figured on the necessity of using a large crane with long boom to reach from outside a building being erected. Gurtzweiler, taking advantage of his MICHIGAN'S compact size and maneuverability, planned to work from a central point inside the building. Result? Henry Gurtzweiler, Inc. got the job . . . another of the many on which the MICHIGAN has given them a competitive advantage.

Moreover, Mr. Gurtzweiler states that although the truck crane is five years old and never has had an idle day, it is still in perfect condition and has had very little maintenance. Why settle for less? Next time you need a truck crane . . . get a MICHIGAN!

## MICHIGAN POWER SHOVEL COMPANY

480 Second Street, Benton Harbor, Michigan, U. S. A.

the heavy duty clutches. Gar Wood's exclusive right angle drive, transmitting power through a universal coupling for lasting alignment, is claimed to reduce fuel consumption by insuring the smoothest possible flow of power and to eliminate the maintenance, noise, slack and back-lash problems of chain drives. An optional hydraulic coupling absorbs the shock loads of rugged excavation and combined with the power actuated clutches and direct drive, retains the "feel" for the smoothest crane performance. Completely convertible in the field to shovel, crane, dragline, clamshell, trench hoe or pile driver, the Gar Wood 75 is also available as a completely convertible, factory installed foundation borer. This Gar Wood attachment combines bell and boring into one operation. In addition to the standard duty and heavy duty basic machines, the Gar Wood 75 is offered as a 20-ton truck crane, mounted on a rugged 6 x 6 or 6 x 4 chassis designed to meet the requirements of high mobility and extremely heavy service. Findlay Division, Gar Wood Industries, Inc., Findlay, O.

#### 41

##### Rear Dump Wagon

The TR200 motor wagon, a hydraulically operated rear dump wagon, has been added to the LaPlant-Choate line of earthmoving equipment. The T200 two wheeled, rubber tired tractor that powers the wagon is the same tractor used with the TS200 motor scraper. It's available with a choice of diesel engines. One is a Cummins with 165 HP, and the other a Buda with 176 HP. Both are six cylinder engines. Scraper and wagon units are interchangeable. Each uses the same



TR 200 Motor Wagon

hydraulic system. One of the outstanding features of this new unit is the stable wheel base. Four wheel air brakes make it possible to back the unit over the edge of a fill with complete safety. An obstruction-free body interior plus a 70 degree tilting angle assures the complete and easy discharge of all types of materials. The bottom of the body is of the double type construction, housing oak plank fillers to absorb loading shock. High-tensile steel is used for added strength and wearing quality. The unit is equipped with 21.00 x 25 24 ply Rock Lug tires. Top speed is 22 miles per hour at a governed engine speed of 1800 rpm. LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Ia.

#### 42

##### Drafting Kit

A new draftsman's kit, which combines all the necessary drafting instruments and materials in an all-in-one carrying case, has been introduced by Berger Scientific Supplies, Inc. The case is supplied with any one of 8 different types of drawing sets, in addition to the following materials and instruments: protractor, architect's scale, engineer's scale, 8 in. triangle, 10 in. triangle, french curve,

draftsman's tape, pencil pointer, 2 drawing pencils, 2 erasers. There are two large inner compartments for drawing paper, notes, blueprints and other ma-



New Berger Drafting Kit

terials which may be needed by architects or engineers in the field. Information on types of drawing sets available and prices of complete kits may be obtained from Berger Scientific Supplies, Inc., 342 Madison Ave., New York 17, N. Y.

#### 43

##### Wire Rope Cutter

A new latch-type design wire rope cutter has been developed by Manco Mfg. Co. This Series 15 Guillotine is simple to operate. A click of the latch opens the anvil; material to be cut is laid in position, and main body of tool is raised back to vertical position which automatically locks tool in cutting position. Cutting time as little as 7 seconds can be obtained, depending on pump assembly used. The

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**HERE SOON!**

## RUEMELIN BLAST GENERATORS

### FOR CLEANING BRIDGES— WATER TOWERS—STRUCTURAL STEEL



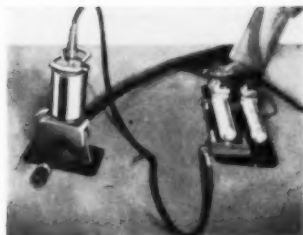
Many contractors use Ruemelin Blast Generators for cleaning steel work to remove rust, paint and scale before repainting. These machines are also used to remove laitance from cement wherever concrete construction is in progress. A wet adapting nozzle can be furnished to convert dry machines to wet type of operation. Built in several sizes.

Write for  
Bulletin 36-C

**RUEMELIN  
MFG. CO.**

3990 N. Palmer St.  
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Manufacturers  
and Engineers  
SAND BLAST AND  
DUST COLLECTING  
EQUIPMENT,  
WELDING FUME  
COLLECTORS.



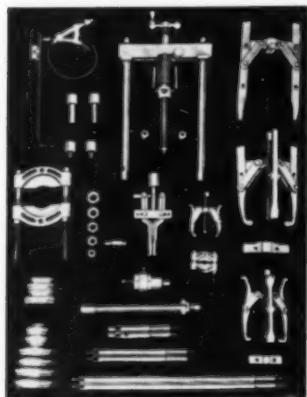
Series 15 Guillotine Cutting 1 1/4 in. Wire Rope

company states that Series 15 Guillotine exerts up to 50 tons thrust, which makes clean cut through up to 1 1/4-in. wire rope. Heavy-duty shear-type blades are easily removable for resharping when needed. Manco Mfg. Co., Bradley, Ill.

#### 44

#### Service Set for Tractors

A new set of International tractor tools which quickly and inexpensively convert all existing International sets to hydraulic power has been announced



New OTC Hydraulic Service Set

by Owatonna Tool Co., 435 Cedar St., Owatonna, Minn. This set, with the OTC 17 1/2 ton power-twin hydraulic ram is stated to contain the minimum assortment of pullers, adaptors and attachments essential to service International farm tractors.

#### 45

#### Self-Priming Centrifugal Pumps

The addition of three larger sized pumps, namely the 20M, 30M and 40M, to its line of self-priming centrifugal pumps, has been announced by Rice Pump & Machine Co. These pumps conform to the standard of the Contractors Pump Bureau of the Associated General Contractors of America and are powered with well-known makes of air-cooled gasoline engines. The design of these larger units include cartridge type shaft seals, open type non-clogging impellers, hardened steel wearing plates, built in check valves, and straight line flow of water through the suction openings to the impeller. These new sizes are available mounted on skids, on two pneumatic tired wheels, or on steel wheels. The 30M and 40M on two pneumatic tired

## How to Double the usefulness of your pick-up trucks!

### LIFT-O-MATIC End Gate

Simplifies loading and unloading of heavy drums, barrels, cartons, etc., with only one man. Powerful hydraulic hoist raises 7-ton loads from ground or deck to truck floor level in seconds . . . lowers loads gently to any level. Saves costly damage to cargo . . . avoids painful injuries and lost-time accidents to personnel.



### DUMP-O-MATIC Body Hoist

Eliminates hand unloading . . . converts your pick-up into a "rush order" dump truck for delivering sand, gravel and supplies. Improved 3-ton capacity, twin hydraulic hoist . . . exceptionally low mounting height . . . single dash control.

Precision Hydro-clutch pump drives off fan belt, operates only when power is needed.



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N-81-C-1



## NATIONAL LIFT

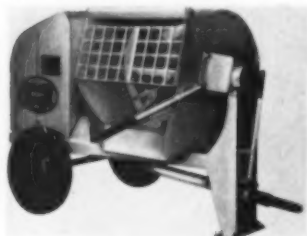
Pick-up Dump Pick-up Tail Gate Snow Plow Controls

wheels are provided with trailer hitches as standard equipment. Rice Pump & Machine Co., North Milwaukee St., Grafton, Wis.

46

### Plaster and Mortar Mixer

A new 6 cu. ft. capacity plaster and mortar mixer (Model 80), announced by Muller Machinery Co., Inc., has the Muller everlasting shaft seal, (Pat. Pdg.) which replaces the conventional stuffing boxes and packing. According



Model 80 Plaster and Mortar Mixer

to the manufacturer, this new seal not only reduces friction loss but it also alleviates wear on the paddle shaft. As a result of extreme field tests the Muller Company, guarantees the seal against replacement during the entire life of the mixer. Power is optional with 4.5 H.P. or 7.7 H.P. Briggs and Stratton air cooled engines or 3 H.P. electric motor. Muller Machinery Co., Inc., Metuchen, N.J.

47

### Paddle Concrete Mixer

A new concrete mixer, announced by McCoy Econ-O-Mixer Corporation, mixes in a stationary drum by means of a patented paddle that is stated to wipe the drum clean, automatically, at the end of each mix. The mixer is made in 2 and 3 cu. yd. sizes. The mixer weighs 3,000 lb. and is easily installed on any 2-ton chassis. The 2 cu. yd. size overall height of mixer and truck is 7 ft. 6 in. The length of drum is 6 ft. with a diameter of 4 ft. The 3 cu. yd. size has an overall height of 8 ft. 6 in.; the drum is 6 ft. long and 5 ft. in diameter. The Mixer has an 8 ft. swivel chute that swings at right angles to either side. The mixer is powered by the truck motor. McCoy Econ-O-Mixer Corporation, 3631 Parkinson St., Detroit 10, Mich.

48

### Steam Cleaning Unit

A new heavy duty cleaning unit, announced by Kelite Products, Inc., is designed especially for cleaning heavy construction equipment. It is also effective in any heavy-duty cleaning operation in automotive repair or maintenance shops. The unit has two high volume steam guns, each delivering 150 gals. per hour. In addition to the unusually large steam cleaning capacity, the unit incorporates a high-pressure water gun supplying hot or cold water at a pressure of 500 lb. per square inch. The power-blast feature of the unit delivers 1,000 gallons of water per hour for blasting away accumulations of mud, muck, heavy grease, etc. The water gun has also been



Power—Master Cleaning Unit

found exceptionally efficient in de-icing operations. Kelite Products, Inc., 1250 North Main St., Los Angeles 12, Calif.

49

### 600 Cu. Ft. Portable Air Compressor

A new 600 cu. ft. portable air compressor has been added to the line of the Gardner-Denver Co. The Gardner-Denver 600, the manufacturer states, has been designed from the ground up for 600-foot capacity. A rugged under-carriage provides the stamina required for moving the machine over rough terrain to location on construction projects. The engine was selected to provide reserve power at moderate operating speeds. The compressor is an 8 & 6 1/2 x 6; operates at 1200 r.p.m.; and is designed with large valve areas, large radius air passages, and carefully engineered ratio of low pressure to high pressure cylinders—features which are said to provide the rated 600 cu. ft. capacity with good compression effi-

# Zettelmeyer

## Auto-Schütter

Hubert Zettelmeyer Konz bei Trier (Germany)

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ciency. Like other Gardner-Denver portables, the new 600 is a two-stage machine, with water-cooled compressor cylinders. Gardner-Denver Co., Quincy, Ill.

## 50

### Welding Flux

A new welding flux that is equally effective in a paste or as a powder and is applicable to aluminum and stainless steel has been announced by All-State Welding Alloys Co. Outstanding features claimed by the manufacturer are that the new flux does not break down even at temperatures required for welding stainless; does not flake off and leave surface unprotected causing rough bubbly weld; does spread thinly and evenly ahead of flame; does clean oxides efficiently ahead of puddle; does float any remaining impurities smoothly out of puddle leaving bright, smooth, flux-protected puddle at all times; does protect aluminum or stainless on each side of weld area and cleans easily. All-State Welding Alloys Co., Inc., White Plains, N. Y.

## 51

### Threaded Steel Rod

A new threaded steel rod for industrial repair, installations, and construction work, is designed to save time and money on jobs requiring long bolts or rods, or bolts of special shape. The new threaded steel rod, known as Redi-Bolt, comes in straight 36 in. lengths and in six diameters— $\frac{1}{4}$  in.,  $\frac{5}{16}$  in.,  $\frac{3}{8}$  in.,  $\frac{1}{2}$  in.,  $\frac{5}{8}$  in., and  $\frac{3}{4}$  in.—precision-threaded the full length. It is made of cold-drawn steel—20% stronger than ordinary steel. A special coating protects the rod against rust. Long straight bolts and adjusting rods can be made in seconds by simply hacksawing Redi-Bolt to size, and fitting with standard nuts. Or, after heating the rod with a blowtorch, it can be bent into U-bolts, L-bolts, eye-bolts, or any one of a dozen other shapes. No threading is necessary. The part is ready for immediate installation. Redi-Bolt, P. O. Box 6102, Chicago, Ill.

### With the Manufacturers

V. M. Dobeus Is Dead. V. M. Dobeus, president and general manager of Tractomotive Corporation, Deerfield, Ill., died April 8 at the age of 50.

Dobeus and Paul B. Cochran founded the company at Findlay, O., in September, 1945, to manufacture allied equipment for crawler and industrial wheel tractors for use in road building, materials-handling, general construction and oil fields. He became sole owner shortly after the firm moved into its new plant at Deerfield in November, 1948.

Wheeler Named District Sales Manager. M. E. "Duke" Wheeler has been appointed district sales manager of Schield Bantam Co., Waverly, Ia. His headquarters will be in Kansas City, Mo., and he will cover Iowa, Minnesota, North and South Dakota, Nebraska and a part of Missouri and Kansas.

Karcher Now Memphis Manager. H. G. Karcher, industrial sales manager of the Kansas City, Mo. branch, Tractor Division, Allis-Chalmers Manufacturing Co., Milwaukee, Wis., since 1944, has been named manager of the firm's Memphis, Tenn. branch. He succeeds G. M. Malmo who died April 7.

## For the Pump to handle the Roughest, Toughest Jobs with ease depend on **CARVER** **DIAPHRAGM PUMPS**

- ★ 4" Suction and Discharge
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Nothing fragile about these pumps, no underpowering, no compromise on quality. Throughout their many years Carver Pumps have earned an enviable reputation on the toughest construction jobs.

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CARVER manufactures a complete line of the highest quality self-priming pumps in all sizes from 4,000 to 240,000 G.P.H. gasoline engine, diesel, motor or belt drive. See your CARVER Distributor or write for Bulletin No. 110.

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## SAUERMAN CRESCENT ★ SCRAPER



CRESCENT Scraper buckets are built in five types and fifteen sizes. Pictured above is a 1 cu. yd. size designed for heavy excavating.

ON THOUSANDS of earthmoving jobs, Sauerman Scraper machines equipped with the unique Crescent bottomless bucket, are cutting costs in digging, hauling, and dumping almost every kind of material.

A Crescent bucket penetrates tough materials with ease, gets a full load quickly hauls this load at speed of 400 f.p.m., dumps automatically wherever operator desires—all with economical use of power.

Ask for Catalog J

**Sauerman Bros. Inc.**

588 S. Clinton St. Chicago 7, Ill.

## MANUFACTURERS' LITERATURE

52

### Paving Repair Unit

The new Patchmobile Model PM-200, stated to have approximately 45 per cent greater asphalt capacity than the company's previous models, is covered in a new 8-page circular. The Patchmobile is a mobile unit that makes it possible to mix, heat and lay hot asphalt, right on the job. The new model is stated to be capable of producing one to two tons of hot patch material per hour. It has a sand dried capacity of 800 lbs., an asphalt heater capacity of 55 gal., and a pugmill capacity of 4 cu. ft. per batch. Wylie Brothers, Inc., 1840 West Reno, Oklahoma City, Okla.

53

### Trenching Machines

Two new catalogs describing the Buckeye Model 314 and Model 303 Wheel type ditchers have been announced by Gar Wood Industries, Inc. The Model 314 catalog explains in detail the construction and operational features of this pipeline and utility ditcher which features with a fluid coupling for more efficient power transmission and longer service life through cushioning of shock. The 303, a versatile, medium utility ditcher features ease of accurate operation and efficient power transmission. Like the 314, the Buckeye 303 has a split torque type conveyor drive and one-piece digging rim designed for variable bucket spacing. Gar Wood Industries, Wayne, Mich.

54

### Hoists and Bodies

An informative and attractive bulletin on Perfection Steel Body Co. Model 720, 725, 820, and 825 hydraulic hoists, for use with their series 100 and 200 bodies, is now ready for distribution. The manufacturer claims that body sway and weaving are reduced by two heavy lifting arms (actuated by the motion of the piston) that impart an upward lifting motion directly to the understructure of the body through two rigid, widely spaced lifting links. Body lift brackets are bolted to longitudinal sills, distributing power thrust to the entire understructure rather than to a small area of body floor. Perfection Steel Body Co., Gallon, Ohio.

55

### Aridifier

A new catalog on the Logan Aridifier, a mechanical cleaner claimed to remove 92% of oil, moisture and dirt from compressed air and gas lines, has been issued by Logan Engineering Co. Descriptive matter and illustrations explain the operation and application of the aridifier. Information is given on how to select the proper size. Logan Engineering Co., Aridifier Division, 4901 W. Lawrence Ave., Chicago 30, Ill.

56

### Traffic and Safety Signs

A new brochure showing the complete line of Eastern metal traffic signs in color features the patented "A" stand

## UNI-BATCH Cost Saving Equipment

Use With 65 and 165 Concrete Mixers—  
Inclusive



Charge bin with end loader having mechanical or hydraulic type bucket.



Pall Unibatch behind pickup truck.

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Used in 30 Different States

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MOTORS CORP.**

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for use by highway crews. The stand cannot blow over in strong winds or from backwash of passing trucks. All Eastern metal signs are made in compliance with official American Standards Association specifications and lettered according to the recommendations of the U.S. Department of Commerce and States' official uniform designs. Eastern Metal of Elmira, Inc., Elmira Heights, N.Y.

## 57

### Sanding Applications

"Better, Faster Finishing for Production and Maintenance Jobs" is the title of a new bulletin on industrial sanding applications published by the Pneumatic Division of Sundstrand Machine Tool Co., Rockford, Ill. The bulletin covers three major subjects—(1) advantages of straight-line sanding action, (2) illustrations showing how air sanders are used for a multiplicity of operations in the plant, and (3) specifications on the four models of Sundstrand Air Sanders and Accessories.

## 58

### Welders

A complete catalog showing the scope of the equipment manufactured by Miller Electric Manufacturing Co., has been issued. Thirty-one models are illustrated and described and specifications are given of particular interest to the construction industry are Models AEA-200 and AEA-200-1. There are gasoline engine driven portable welders. They are a combination high cycle AC welder and power plant. The unit may be converted by means of an easily accessible switch from a welder to a 3KW 110/220 volt, 60 cycle A.C. power plant. The selenium

## CUT JOB-TO-JOB TIME LOSS MILLER Tilt-Top gets slow machines there faster



### MODEL "B" 4 TON \$755\*

Equipped with four 7.50x16 ply truck tires, electric brakes and 14 ft. platform.

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research engineers

Your slow moving machines can be kept on the job . . . when you have a MILLER Tilt-Top handy . . . its the extra trailer for extra production. Self-moving equipment such as rollers, dozers, paving machines, etc., practically load themselves onto tilted platform and are towed to the next operation in jig time . . . cutting non-productive time for operator and equipment to a minimum.

All steel chassis has 8"x14" oak platform, I beam, straight-through axle with solid steel, stub inserts, and "easy-hitch" balanced tongue.



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Dept. C-6 458 S. 92nd ST.  
MILWAUKEE 4, WIS.

rectifier type D.C. arc welders, introduced by this company less than two years ago, are covered in its catalog. Miller Electric Manufacturing Co., Appleton, Wis.

## 59

### Municipal Parking and Traffic Control

A new booklet by Dr. Miller McClintock, published by M. H. Rhodes, Inc., contains practical and helpful advice in solving critical traffic and parking problems in cities. The author gives specific plans for making best use of the curbside parking spaces so that these will be more available to the community's errand and clientele parkers. A special feature of the booklet is the recommendation that funds realized from parking meters be used to establish off street

areas, which in turn become self-supporting through parking meter receipts. M. H. Rhodes, Inc., are makers of the Mark-Time "Hurricane" parking meters. The Rhodes "Parkade" Plan is described in a special chapter in the book. The booklet is available without charge from the M. H. Rhodes, Inc., Hartford, Conn.

## 60

### Low Oil Pressure Warning Unit

A 2-page bulletin No. 102 illustrates and describes the Kysor pressurestat. This unit can be installed in any convenient place in the oil system. When the oil pressure drops below the desired working pressure as preset on the pressurestat, a contact is made completing an electric circuit to a warning light or



## WELLMAN Williams Type FAST BUCKET OPENING SPEEDS OPERATIONS

- Double-hinge construction on Wellman's multiple-rope bucket permits faster opening than a single hinge. This speeds up operations, also gives a bigger spread in the open bucket for the same headroom.

Wellman's welded-design buckets offer you better performance and longer service. In all types and sizes you'll do better with Wellman!

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CUSTOM-BUILT BUCKETS  
STONE AND WOOD GRABS

THE WELLMAN ENGINEERING COMPANY  
7000 Central Avenue  
Cleveland 4, Ohio

buzzer which warns the operator that the engine must be stopped. Installation diagrams are included in the bulletin. Kysor Heater Co., Cadillac, Mich.

#### 61 Scales

A new 28-page condensed scale catalog No. 11 has been released by The Howe Scale Co. It includes a selection of 1000 popular standard Howe scales weighing from 1/64 oz. to 400 tons. Complete specifications, spot illustrations and essential information are given. The Howe Scale Co., Rutland, Vermont.

#### 62 Engines

A complete line of literature describing the Gladden engines is available. The company has been building engines for 33 years, and its products have had wide acceptance by contractors. The company makes 4, 5 and 7 H.P. single-cylinder air-cooled engines. In addition to the utility line the company produces 4 and 7 H.P. engines designed particularly for marine operation. In the design of the engines particular attention has been given to developing easy service features and simplicity of installation and overhaul. Gladden Products Corporation, 635 West Colorado, Glendale 4, Calif.

#### 63 Automatic Weighing Accessory

A four-page folder (Form 668) illustrates and describes the new Howe 77 Weightograph, which features a new projection type of weight indication.

Twenty important features of this revolutionary automatic weighing accessory are listed along with descriptions and photographs of the unit. The Weightograph can be simply attached to any beam scale, or to any scale convertible to beam operation, making an old-fashioned beam scale an "automatic" of the latest type. The Howe Scale Co., Rutland, Vt.

#### 64 Blasting Unit

A new multiple-shot blasting unit, said to incorporate improved firing action, safety and dependability in a compact and lightweight assembly, introduced by Mine Safety Appliances Co., is described in a bulletin. The new MSA multiple-shot blasting unit (U.S. Bureau of Mines Approval No. 1608) weighs one lb. measures 2 1/2 in. x 2 1/4 in. x 4 1/4 in., is carried on the belt by means of a snap-on clip. It will fire up to 10 shots simultaneously. There is no danger of accidental firing, designers point out, as the wiring circuit is completely insulated from the battery container. And because the new unit is capacitor-operated, the full charge is dissipated with each shot, eliminating misfires. Mine Safety Appliances Co., Braddock, Thomas and Meade Sts., Pittsburgh 8, Pa.

#### 65 Wood Preservation

Detailed answers to questions frequently asked about pentachlorophenol, a chemical widely used to protect wood against decay and insect attack, are contained in a 40-page booklet available from Monsanto Chemical Co. The 51

questions answered in the booklet are those which Monsanto representatives have been asked most often by contractors, lumber dealers, architects, and home owners. They range from "What is Penta?" to "How do Penta solutions preserve wood?" Monsanto Chemical Co., St. Louis 4, Mo.

#### 66 Welding Alloy

A new leaflet (TIS991), featuring actual case histories of savings in production and maintenance through the use of "Eutic Trode 27," a new non-critical (no nickel) electrode for all types of cast iron or cast iron to steel structures, is available from Eutectic Welding Alloys Corporation, Dept. F, 172nd St., and Northern Blvd., Flushing 58, N. Y.

#### 67 Diesel Tractor

The many applications of the Caterpillars D4 diesel tractor are illustrated in a new catalog. The catalog explains, part-by-part, how the tractor is built, what it's like and how it performs. Attachments and specifications are listed. Reports from D4 tractor owners on typical jobs are shown. More than 80 photographs and illustrations are included in the 32-page catalog (Form 30291). Caterpillar Tractor Co., Peoria 8, Ill.

#### 68 Friction and Hydraulic Drives

Much useful information on the application of power to industrial machinery is contained in the Basic Indus-

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tries Issue of Production Road, house organ of Twin Disc Co. A wide variety of usages to which industrial friction and hydraulic drives are being applied—from farm tractors to fishing trawlers; from mining shovels to machine tools—are described through readable articles and graphic, on-the-job illustrations. Production Road is regularly issued, and will be mailed upon request addressed to the Twin Disc Clutch Co., Racine, Wis.

69

#### Export Information

Because the courts of many countries interpret international trade regulations differently from those of the United States, the Barr Shipping Co., foreign freight forwarders and custom house brokers, has issued a booklet on foreign trade definitions containing advice on how to avoid costly errors of interpretation. It also includes handy numerical conversion tables. Designed for use by manufacturers of products with overseas destination and import-export firms, the 32-page booklet defines terms employed in foreign trade procedure in concise, easy-to-understand form and lists the requirements of buyer and seller under the various regulations. Copies may be obtained by writing, Barr Shipping Co., 25 Broadway, New York 4, N. Y.

70

#### Circuit Breakers

A complete study of Type AB circuit breakers is given in a new 35-page booklet (B-5407) available from the Westinghouse Electric Corporation. Photographs show the actual De-ion arc quenching action of all AB breakers; confine the arc, divide it, extinguish it. A "quick guide" to AB circuit breakers gives the types, their ratings, and standard and special features. Westinghouse Electric Corporation, Box 2278, Pittsburgh 30, Pa.

71

#### Pipe Corrosion Protection

Protecting buried pipes from corrosion with "Scotch" plastic tapes is the subject of a new 8-page illustrated booklet available from Minnesota Mining and Manufacturing Co. It describes and illustrates both high speed machine and hand wrapping techniques for protecting natural gas and water mains, joints and leads from the corrosive effect of soil chemicals, oils and fats, stray ground, ground currents and soil bacteria and fungi. Minnesota Mining and Manufacturing Co., 900 Fauquier St., St. Paul 6, Minn.

72

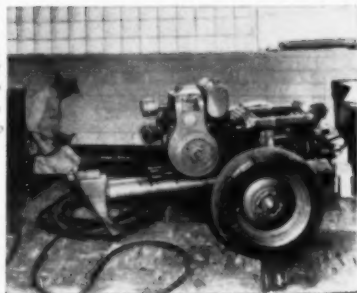
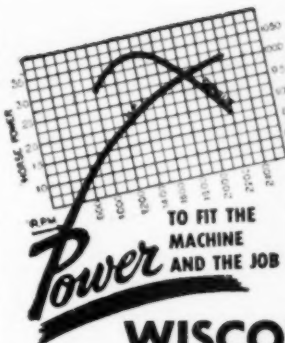
#### Concrete Additive

A new folder gives complete information on AWOG, a chemical added to concrete which is claimed to produce longer wearing floors, resistant to acid, water, oil and grease. Flexrock Co., 3668 Cuthbert St., Philadelphia 4, Pa.

73

#### Soil Sampling

A new comprehensive 16-page bulletin contains a complete collection of data and information about soil sampling techniques accumulated during the past 33 years by the Acker Drill Co. Modern sampling methods are discussed along with recommendations as to correct tools and accessories best suited for economical recovery of samples. Acker Drill Co., Inc., Scranton 3, Pa.



## WISCONSIN-POWERED Ingersoll-Rand Compressor

Wheeling a modern, mobile compressor to any spot it's needed is easy when it's an Ingersoll-Rand. Then doing a day's work on location is also a "sure thing" if a Wisconsin Heavy-Duty Air-Cooled Engine supplies the power.

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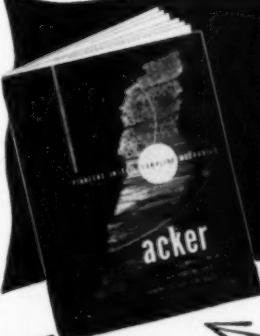
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## 74

### Rock Bits

Forged steel rock bits in three socket types and seven types of hollow steel drill rods are described and illustrated in catalog V-1708, available from Drill Bit and Tool Co. DRT Midland bits are shown for  $\frac{3}{8}$ , 1 and  $1\frac{1}{4}$  in. sockets. Bit sizes range from  $1\frac{1}{4}$  to 2 in. Either center or single side hole is obtainable. A cast steel knock-off tool for easy removal of bit from drill rod is described. Drill Bit and Tool Co., Midland, Pa.

## 75

### Crawler Crane

The new American crawler crane, a  $\frac{3}{4}$  yd. machine, is described in catalog available from American Hoist & Derrick Co.

The new catalog shows action views of the crane and points up the availability of interchangeable fronts—crane, shovel, dragline or pull shovel. Overall specifications are listed. American Hoist & Derrick Co., St. Paul 1, Minn.

## 76

### Fork Lift Trucks

The Ruda new "FT" series fork lift trucks is illustrated and described in three bulletins as follows: Bulletin 1579—Models FT30-24 (gasoline powered) and model FTD30-24 (Diesel powered) fork lift trucks, 3,000 lb. capacity at a 24 in. load center. Bulletin 1580—Models FT40-18 (gasoline powered) and model FTD40-18 (Diesel powered) fork lift trucks, 4,000 lb. capacity at an 18 in. load center. Bulletin 1581—Model FT40-

24, gasoline powered) and model FTD40-24 (Diesel powered) fork lift truck, 4,000 lb. capacity at a 24 in. load center. The Ruda Co., Harvey, Ill.

## 77

### Power Operated Valve

The new POV power operated valve of Leden Manufacturing Co. is featured in Bulletin 1000. Complete information including illustrations, operating and circuit diagrams, dimensions and weight, plus applicable pilot valves are detailed in this bulletin. The valves are available in six sizes suitable for air, oil and water operation with option of finger, cam, toe or solenoid pilot controls. Leden Manufacturing Co., 1600 South San Pedro St., Los Angeles 15, Calif.

## 78

### Rust Preventive

A 16-page, 2-color general catalog (No. 251) listing Rust-Oleum, rust preventive applications is available. Of particular interest is the fact that the catalog features the use of color throughout to illustrate exact color. Detailed information and technical data complete with applications, resistance qualities, drying time, thinners and special applications are included. Rust-Oleum Corporation, 2799 Oakton St., Evanston, Ill.

## 79

### Flexible Shaft Unit Drives

The complete new line of ready-to-use Econoflex flexible shaft unit drives, available for shipment from stock, are illustrated and described in Catalog No. 210 issued by Elliott Manufacturing Co. The drives are made in four size ranges: Heavy duty, medium duty, light duty and drill shaft unit. Complete specifications, accessories, etc., are shown in the catalog. Elliott Manufacturing Co., 415 Prospect Ave., Binghamton, N.Y.

## 80

### Arc Welding

Volume IX, No. 1, Hobart Arc Welding News, a 16-page booklet of interesting photographs and articles on welding from all over North America is now available. Many of the articles feature time-and-money saving applications. To get your copy, write the Hobart Brothers Co., Troy, O.

## 81

### Storage Battery for Trucks

A new storage battery now being manufactured by Chicago Forging & Mfg. Co., is covered by an 8-page brochure which gives a complete description of this new type of battery. The battery is claimed to provide more power and longer life because it ends corrosion and vibration damage and eliminates plate shedding and buckling. Chicago Forging & Mfg. Co., 1317 W. North Ave., Chicago 22, Ill.

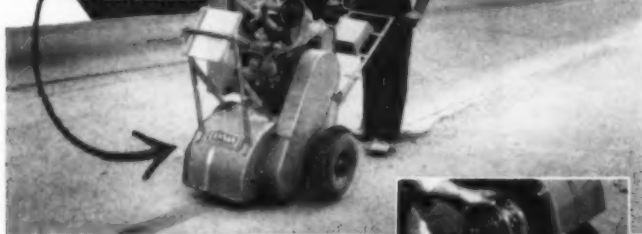
## 82

### Centrifugal Pump

A specification folder describes the new Kenco Model P-10 all-purpose centrifugal pump. This model is the most recent design in the Kenco line and features a completely submersible pump, hermetically sealed, that will handle a wide variety of liquids. Maximum pump capacity is 1,000 gal. at zero heads with a maximum head of 9 ft. Kenco Incorporated, 1125 North Ridge Road, Lorain, O.

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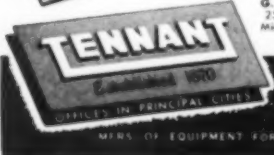
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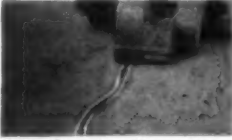


## Joint Cleaning Machines

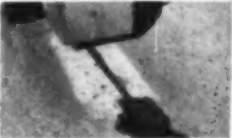
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CUTTERS are easily spaced to clean joints from  $\frac{3}{8}$ " to  $2\frac{1}{4}$ " wide or more. Very durable.



CLEANING irregular crack is easy as cutters follow winding fissure. No skill needed.



EXTRUDED MATERIAL shaves off instantly with 4" cutting head. Leaves smooth surface.

## Reduction Gears

A 4-page folder has been issued by Snow-Nabstedt Gear Corporation, illustrating construction, industrial and farm machinery driven by engines equipped with S-N industrial reduction gears. It shows a few of their many possible applications including bridge-raising, pumping, dredging, quarrying, ditching and sand pit dragging. The folder describes the part played by heavy duty S-N industrial gears in transmitting full power from the engine to the load at the most economical or necessary speed for the driven equipment. Snow-Nabstedt Gear Corporation, 222 Welton St., Hamden, Conn.

## Power Sweeper

The new Model 1000-S Wilshire Multipurpose power sweeper is illustrated and described in Bulletin S-102. This sweeper is designed to meet industrial sweeping requirements inside and outside, wherever a man can push a broom. It is stated that the 48 in. model will sweep in excess of 90,000 sq. ft. per hour, and the 36 in. model in excess of 65,000 sq. ft. per hour. Wilshire Power Sweeper Co., 526 W. Chevy Chase Drive, Glendale 4, Calif.

## Repairing Conveyor Belts

Complete information on how to use Magic-Vulc plastic rubber for repairing conveyor belts is contained in a new folder now being distributed by Magic Chemical Co. Names of industrial users and actual case history reports are included, showing that use of Magic-Vulc has often doubled or tripled belt life, with savings in belt replacement costs. Use of Magic-Vulc to repair worn spots on conveyor belts quickly, easily and inexpensively is fully explained in the new folder. Magic Chemical Co., Dept. N104, 121 Crescent St., Brockton 2, Mass.

## Heat Machines

A 6-page bulletin contains a description of the new air cooling feature of Fageol heat machines. The bulletin tells how the Fageol Model PW-189 can be converted in five minutes' time from a 189,000 BTU portable heat machine which efficiently heats a 6-foot-high work zone, to a 1500 c.f.m. cool air circulator which provides comfortable air conditioning in summer. Fageol Heat Machine Co., 5725 Mt. Elliott Ave., Detroit 11, Mich.

## Truck Mixer

The new McCoy Econ-O-Mixer is illustrated and described in a 2-page circular. A feature of this machine is a patented paddle that wipes clean as it mixes. Fine cutting blades, set at angle, mince the mixture which is further agitated at the same time by five wiping paddles, each equipped with a heavy rubber wiper, curved to fit the drum. The mixer is made in 2 and 3 cu. yd. sizes and is easily installed on any 2-ton chassis. McCoy Econ-O-Mixer Corporation, 3631 Parkinson, Detroit 10, Mich.

## Tractor Maintenance

A new Maintenance Guide for Track-type Tractors (Form 30247) has been issued by Caterpillar Tractor Co. Four-color cartoons tell what happens when an owner and service technician compare job notes. The two men discuss basic methods of making tractors last longer and do better work at lower cost. Operating adjustments are simply explained. Proper care of tractor components, such as tracks, seals, fuel system and filters, is shown. Also featured is the opportunity to economize by having the dealer rebuild worn parts. "Maintenance Guide for Track-type Tractors" is the second in a cartoon booklet series devoted to equipment maintenance. Caterpillar Tractor Co., Peoria 8, Ill.

## Shovels, Cranes and Draglines

A general line catalog issued by Link-Belt Speeder Corporation provides a handy digest of all the company's current models of shovels, cranes and draglines. The catalog, No. 2373, includes photographs and brief descriptions and applications of 16 models. Of particular interest is the listing of "master books" containing complete data on each model to augment the thumbnail description contained in the general line catalog. The new catalog in-

## NOW! An ABRASIVE BLADE

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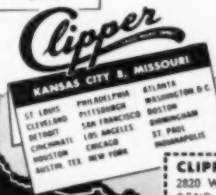
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Any MASONRY or CONCRETE CUTTING**

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cludes material on the complete line ranging from 1/4 to 3 yd. capacities, 10 to 60 tons lifting capacities, and description of crawler mounted, wheel mounted and truck mounted equipment. Link-Belt Speeder Corporation, 1201 6th St. S.W., Cedar Rapids, Ia.

90

## Service Tools for Tractors

A new 12-page manual gives complete information on new OTC tools especially designed for servicing International tractors. Both manual and hydraulically operated pulling tools are shown with attachments and accessories for use with the OTC Power-Twin hydraulic puller. Also illustrated is a conversion set with which manually operated sets now in use may be converted to hydraulic power. Owatonna Tool Co., 417 North Cedar St., Owatonna, Minn.

91

## Rod Cutting Tools

A new 8-page catalog on its Guillotine line of portable hydraulic cutting tools, available from Manco Mfg. Co., illustrates and describes six series of Guillotine and 28 different models. Their uses, capacities and specifications are covered. The Guillotines exert up to 50 tons thrust and cut materials ranging from 1/2 in. steel rods to 3 1/2 in. armored cable. A complete line of special and accessory equipment is listed. Manco Mfg. Co., Bradley, Ill.

92

## Rubber Hose Assemblies

A new catalog giving specific data on rubber hose assemblies for all types of construction equipment is available from Dept. E-2, Carlyle Rubber Co., 64 Park Place, New York 7, N. Y. This hose is available in two basic constructions: Medium pressure assemblies and high pressure assemblies for working pressures from 800 lb. to 5,000 lb.

93

## Building and Paving Products

A new reference manual produced by The Philip Carey Mfg. Co., contains a complete listing of 800 building materials and industrial products obtained from asbestos, asphalt or magnesia. The manual shows Army, Navy, MIL, Federal, ASTM and other specifications, plus their corresponding product. The information is cross-indexed to provide efficient reference. The Philip Carey Mfg. Co., Dept. FRM, Cincinnati 16, O.

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- 1 Mandt Swing Loader, ½ cubic yard Bucket, used as demonstrator. Price..... \$5,000.00
- 1 Three Quarter yard Link-Belt shovel front for L585 Speeder, complete with Manganesse dipper, logging cable, positive chain crowd, and power trip, used two weeks—New guarantee. Price..... \$3,200.00

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### West River Equipment

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14 Three Yard Box, Jaeger, and Blow Knox. All mounted on K-8 Internationals.

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- 1—Model 25 Northwest Dragline.
- 1—Model "L" Quickway Mounted on 7½ Ton Diamond "T" Tandem Truck.
- 1—Railroad Car Conveyor Loading Plant.
- 3—13 Cu. Yd. Schonrock Cable Dumps Mounted on K-8 International Trucks.

The majority of the above mentioned equipment is not over a year old, but all equipment is in perfect operating condition.

### INTERSTATE CONSTRUCTION MATERIAL CO.

Box 546 Valley Mills, Texas



## WE OWN AND OFFER FOR SALE, FROM STOCK MODERN CONSTRUCTION EQUIPMENT REBUILT & GUARANTEED OR AS IS

**TRACTORS**  
5 Caterpillar D8 3 Caterpillar D4 4 International TD 14 27 Allis-Chalmers HD 14  
4 Caterpillar D7 2 International TD 18 21 Allis-Chalmers HD 10 3 Allis-Chalmers HD 10

### EXCAVATORS

3 Bucyrus Erie 158 Draglines 1-yd.  
1 Inley #12 Crane, 1/2-yd.  
1 Inley #12 Backhoe, 1/2-yd.  
1 P & H Dragline, 1/2-yd.  
1 Bay City 15A Tractor, 1/2-yd.  
1 P & H 25A Crane, 1/2-yd.  
1 Byers 81 Shovel, 1/2-yd.  
1 Northwest 25 Crane, 1/2-yd.  
1 Kookring 304 Crane, 1/2-yd.  
1 Link-Belt 1585 Crane, 1/2-yd.  
1 Scythone 15A Crane, 1-yd.  
2 Northwest 80D Barge Mount Draglines, 2 1/2-yd.

### MOTOR GRADERS

7 Caterpillar 12  
4 Galleon 181  
1 Galleon 201  
2 Adams 412H  
**SCRAPERS**  
6 Super C. Tournepelle, 12 yd.  
2 Woodridge Terracon, 15 yd.  
7 LeTourneau D, 4-yd.  
29 LeTourneau LB, 8-yd.  
1 LeTourneau S12, 12-yd.  
7 Woodridge BBS, 8-yd.  
1 Summit M-60, 18-yd.  
6 Daniels B11, 9-yd.

### MISCELLANEOUS

3 EC 31 Athey Dump Trailers  
2 FC 31 Athey Dump Trailers  
TAMPERS—COMPRESSORS—FORK LIFTS—  
ROAD ROLLERS—JACK HAMMERS—WELDERS—  
WAGON DRILLS  
CLAMSHELL & DRAGLINE BUCKETS  
SHOVEL FRONTS FOR NW25 & NW6

WE INVITE YOUR INQUIRIES AND INSPECTION

### HYMAN-MICHAELS COMPANY

GENERAL OFFICE: 122 So. Michigan Ave., Chicago 3, Ill.  
New York Office: 40 East 42nd St., New York 7, N. Y.  
San Francisco Office: 2200 Jerrard Ave., San Francisco, Calif.  
Los Angeles Office: 4431 E. Shalla St., Los Angeles, Calif.  
Cables: HYMANMIXEL

## FOR SALE

- 1—Navy steel house lighter, formerly Navy Net Tender, 111' long x 34' wide x 11' deep. Excellent condition. Dravo built 1944. Crew space for 20 men, dining room, freazing compartment with freazing unit compact, two large work rooms. Price \$50,000.00. Norfolk, Va.
- 1—800 H.P. General Motors 12-567 Diesel Engine—744 r.p.m. Serial No. H-263 Port. Price \$11,000.00. Arlington, Va.
- 2—100 K.W. Superior Diesel Generator Sets AC or DC GBD-8.5/1x7—1200 r.p.m. Delco Generator 153 H.P. 120/240 volts—417 amps complete with switch gear. Serial Nos. 23548 and P28408. Price \$3,000.00 each. Arlington, Va.
- 1—Steel Spud, 1" wall, 22" O.D., 55' long with point and head sheave.
- 1—Steel Spud, 1 1/4" wall, 23" O.D., 55' long with point and head sheave. Both spuds in new condition, approx. wt. 10 Tons each. Price for both spuds \$7,500.00. Arlington, Va.
- 1—Set of 6 Drum (Hoisting and Swinging) gears, shafting, bearings, etc. Manufacturers—Lambert Hoist. Price \$3,000.00. Arlington, Va.

**J. A. LAPORTE**  
P. O. Box 309,  
Arlington, Virginia

### ARMY SURPLUS EQUIPMENT

WINCHES, DUMP BODIES, HOISTS AND POWER TAKE-OFF. Complete parts for all military trucks and equipment. Call or write us, we have it.

**JOHNSON MOTORS**  
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### FOR SALE

1. 820 Lorain dragline, 70' boom, 2 cu. yd. Hendrix bucket, Serial # 18,673, runs like new. Also 250,000 cu. yd. ditching. Louisiana location. Priced for quick sale.

**A. J. HANSON**  
Pineville, La.

## FOR SALE

Wood Roadmixer, Model 48,  
S/N 105 \$7,000.00  
Wood Roadmixer, Model 54,  
S/N 134 \$9,000.00  
Allis Chalmers Motor Grader,  
Model AD-4, S/N AD-4-2116  
\$8,000.00  
Rome Motor Grader,  
Model 404, S/N 404-941  
\$5,000.00

ALL FIRST CLASS CONDITION

**MATHY  
CONSTRUCTION CO.**  
508 HOESCHLER BLDG.  
LA CROSSE, WISCONSIN

## FOR SALE

- 1 - 8'x12' Marcy Rod Mill Peripheal Discharge complete with Motor, Drives, Control Panel and new set of Horizontal Liners.
- 5 - 4'x10' Tyler Hummer Screens Single Deck Thermoic Power Type Complete.

42x40 Diamond Roll Crusher with 150 H.P. Westinghouse.

**Ralph E. Mills & Gorman Bros.**  
Box 1027, South Hill, Virginia  
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## FOR SALE

TD18 International 1949 Angle Doser  
TD18 International 1946 Doser  
TD18 International 1950 Angle Doser, Hydraulic  
TD18 International 1950 Angle Doser, Hydraulic  
TD18 International 1949 Angle Doser. All with dual cable control units.  
Galleon Motor Patrol 116, 1100 total hours.  
TD9 International—No attachments  
15 Yard LeTourneau Scraper.

**Bob Goltermann**

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Write for Rates or Prices

- 1—750 Watt 110 Volt DC Westinghouse
- 1—800 Watt 110 Volt AC Kohler
- 1—1500 Watt 110 Volt DC Kohler
- 1—1500 Watt 110 Volt DC Kohler
- 1—1500 Watt 110 Volt AC Kohler
- 1—3000 Watt 110 Volt AC Onan
- 1—3000 Watt 110 Volt AC Kohler
- 1—3000 Watt 110 Volt DC Kohler
- 1—5000 Watt 110 Volt DC Kohler
- 2—6000 Watt 110 Volt DC Onan
- 1—10000 Watt 110 220 AC Kohler
- 1—37000 Watt 120 240 3/60 Generator only

We service and repair all makes of Light Plants, Generators and Magnets. All prices good for 30 days only. All plants subject to prior sale and F.O.B., Centralia, Ill. or Evansville, Ind.

**Holtkamp Electric Service Co.**

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Hwy. 460 East, Crossville, Illinois. Ph. 62

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**EUCLIDS**  
17—43FDT Standard Bottom Dump Units  
4—8TD 22-ton End Dump Units  
**COMPRESSORS**  
Gardner-Denver 500 foot Diesel Driven on Pneumatic Tires

## FEHRS TRACTOR & EQUIP. CO.

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## DEPENDABLE USED MACHINES

Graveler 10x36 r.b. crusher  
20'x40 portable conveyor  
Falcon 6" sand pump  
3 yd. Dumpcrane  
RD-7 with radiator  
Hansen truck crane  
**TRACTOR & EQUIPMENT CO.**  
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## 15 AND 22 TON EUCLID REAR DUMP TRUCKS

Good Condition  
Large Group To Choose From  
**STANDARD EQUIPMENT CO.**  
Wilkes-Barre, Pa. Phone 2-1174



## FOR SALE—SACRIFICE

1—Trojan Model PM-16-48 Motor Grader powered by International Model "M" 48 H.P. power unit, 2:50x18 16-ply Road Grader front tires, 14.00x32 6-ply single low pressure Road Grader rear tires, lighting system, leaning front wheels, fully enclosed deluxe cab, hydraulic operated scarifier, 10 foot blade, hydraulic operated V-type snow plow.

New but has been demonstrated.

Our very special price

\$6,500.00

4,895.00

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## MIDWEST EQUIPMENT COMPANY

501 N. 4th St.  
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 Bismarck, N. Dak.  
 Phone 519

Minot Sales Representative

A. D. Benscoter, 601 9th St. N.W., Phone 42-138

Devils Lake Sales Representative

Lloyd P. Nelson, 711 6th St., Phone 815

## FOR SALE

1—Model IIE-4P, Jaeger 11-5 Gasoline operated, 2-bag, Concrete Mixer, with pneumatic tires, in very good condition.

1—IH3—Jaeger Single Drum Hoist, for 2000 lb. single line pull at 150 R.P.M. powered with a VE4 Wisconsin engine, used on one job about 6 months, good as new.

1—37 ft. Jaeger Self Rising Tower, complete with safety device and platform, this works with the above hoist, and was used same amount of time, good as new.

THE GOOD LUMBER CO.

Quincy, Pa.

Phone: Waynesboro 1500

## FOR SALE

Jaeger Bituminous Paver Serial No. 56X265, Model PB-5, purchased new 1950. Machine complete with heating attachment and all Standard Equipment. Only 15,000 tons paving material went thru this machine. New appearance. Condition excellent.

Price \$10,000.00.

Subject to Prior Sale

KIELY

CONSTRUCTION CO.  
 BUTTE, MONTANA

## FOR SALE

- 2—Cleveland Tamper-Backfillers, each ..... \$3,000.00
- 1—Corbitt Tractor, Hughes Carry-All Trailer ..... 4,500.00
- 1—Backhoe for 25 Northwest, 2 buckets—Wide & Narrow ..... 2,750.00
- 1—Buckeye Trencher, Model 12, Excellent Condition ..... 4,750.00
- 1—Backhoe Bucket for Osgood ..... 600.00

J. A. LAPORTE

1101 Wilson Blvd. - P. O. Box 309  
 Arlington, Virginia

## FOR SALE

- 2—NORTHWEST Model 185, 50 ft. booms. May be purchased at slightly higher than junk price. Both in operating condition.
- 1—LINK BELT SPEEDER, 35 ft. boom, dragline bucket, Caterpillar 4 cyl. Diesel engine; fair operating condition.
- 1—P.H. Model 150, 1/2 yard shovel, now being completely rebuilt in our shop.

JOHN R. SPICHER  
 CRANE SERVICE INC.

230 N. 121st St. Spring 4-5950  
 Milwaukee, Wisconsin

## Miscellaneous Items of Construction Equipment For Sale

All Located in the Two Carolinas. Will rent with purchase options to qualified parties.

- 2—Koehring 34 E. Dual Drum Pavers with GMC Diesel Engines
- 2—RB Power Subgraders 20' to 25'
- 2—Blaw Knox Concrete Spreaders 20' 25'
- 1—Koehring Longitudinal Finisher 20' to 25'
- 2—Blaw Knox Model XC Finisher 20' 25'
- 3000 Ft. Heltzel 9" Road Forms
- Caterpillar D-6 with Traxcavator
- Model 54 Wood Roadmixer
- Cleaver Brooks 100 Horse power Boiler
- Hopkins Low Pressure Burners with Electric motor

Forty Thousand Gallon bolted steel tank

**BALLENGER  
 PAVING COMPANY**  
 P. O. Box 927  
 Greenville, South Carolina

## FOR SALE

- BUYCRUS-ERIE model 128-B dragline
- BUYCRUS-ERIE model 54-B shovel
- BUYCRUS-ERIE model 38-B shovel & drag
- BUYCRUS-ERIE model 22-B shovel & backhoe
- NORTHWEST model 6 shovel
- NORTHWEST model 80-D shovel
- NORTHWEST model 80-D shovel & drag
- NORTHWEST 95 DRAGLINE
- LIMA model 1201 dragline
- LIMA model 1201 shovel
- P & H model 955 dragline
- P & H model 1055 dragline
- RAY CITY model 45 shovel & drag
- 10—EUCALID rear dump trucks 22 ton
- 10—EUCALID rear dump trucks 15 ton
- 3—Caterpillar Model D8s
- Manitowoc Model 4500 dragline caterpillar
- 4—Tractors model 7s
- LETOURNEAU model LP scraper
- BUFFALO-SPRINGFIELD 10 ton roller
- CEDAR RAPIDS portable crushing plant
- CEDAR RAPIDS asphalt plant

Write Box 1075

ROADS AND STREETS

22 W. Maple St.

Chicago 10, Illinois

## FOR SALE

## GRAVEL PLANT

Portable crushing & wash gravel plant 10" x 24" Pioneer crusher with scalping screen-lead hopper & Pioneer feeder, 80' delivery conveyor to crusher, 40' Columbus bucket elevator from crusher to scrubber, Cedar Rapids scrubber & triple deck screen with 4 oil-wet bins and sand drag. This is an all electric plant with gear head motors. Produces 80 to 100 tons per hour of crusher run material or 3 sizes of washed gravel at one time. Lots of spare screens and parts. Bargain.

Price Complete \$27,500.00

Reason for selling—deposit exhausted.

Miller Bros. Contractors

R.R. 1, West Milton, Ohio

Phone 724-W

## LIQUIDATION

## SALE

REAL BARGAINS  
 AVAILABLE

1 C. S. Johnson Batch  
 Plant including:

- 1 Shaker screen Assembly Comp. w/ Switch Boxes & Controls
- 1 Cement Scales
- 1 Open Control Panel
- 1 Water Butcher
- 1 Dispenser, Air Entraining
- 1 Set Aggregate Scales
- 1 Set Weighing Hoppers
- 2 Sels Screw Conveyors, Comp. w/ Sprocket & Chains
- 1 GE Motor 3 HP
- 1 V.S. Motor 10 HP
- 2 Relays
- 1 Dispenser, Admix for Air Entrainment
- 1 Motor, Elec. U. S. 10 HP
- 1 Lot assorted Cond. & Wiring for Batch Plant
- 1 Cement Unloader, Comp. w/ Housings, Screws, Hoppers, LeRo Motor
- 3 Valves, Control, Hydraulic
- 3 Concrete Buckets, Johnson, 2 C. Y. Cap.
- 6 I Beams, Steel, 24" x 80"
- 1 Generating Plant, 75 KWH w/ D19000, Cat. Motor

Great number small miscellaneous concrete tools and materials.

W. D. WILSON

Citizens Bank Building

Phone 3512

P. O. Box 390 Clovis, New Mexico

## FOR SALE

One Osgood 1/2 yd. Model 200 1948 Crane, 35' boom, Buda HP-326 Engine. Used only for hook work, perfect condition. Can be seen and inspected at Underwood Veneer Co., Wausau, Wis. PRICED FOR QUICK SALE.

One Buckeye 1948 1/2 yd. Shovel Pulldriver, Dragline Combination, Gasoline Power, in perfect condition. Can be inspected at Duluth, Minn.

Berry, Inc.

DULUTH, MINN.

DIAL 2-8174

**JAEGER BITUMINOUS MIXER**

Model BP-5, complete with heating attachment and all standard equipment. Excellent condition. Has processed only 15,000 tons of material. Bargain at \$10,500.00.

**3—ATHEY RUBBER TIED QUARRY TRAILERS**

15-Ton capacity. With oak filled floor. Air brakes and hydraulic dumping equipment. Purchased new 1961, used sixty days. Excellent condition. Offered at \$5,500.00 each.

**AUSTIN-WESTERN DUPLEX CRUSHING PLANT**

Consisting of 20" x 36" Primary Jaw Crusher, and 4' x 12' double deck vibrator screen and 30" conveyor, mounted on 4-wheel pneumatic tired trailer. Buda-Lanova Power Unit, Model 6D11-1611, mounted on GMC truck, complete with belt and pulley. 22" x 40" Roll Crusher, with 4' x 12' double deck vibrator screen and 30" conveyor, mounted on 4-wheel pneumatic tired trailer. Caterpillar D13000 Power Unit, mounted on GMC truck and complete with belt and pulley. 2—Stacking Conveyors, with 30" belts mounted on pneumatic tired hydraulic cradle trucks. Complete outfit priced at \$32,500.00.

**CATERPILLAR MODEL 40 ELEVATING GRADER**

Complete with power unit and on pneumatic tires.

**MODEL 44-B BUCYRUS-ERIE COMBINATION**

Shovel and Dragline with 70-ft. boom and 2 c.y. Page Dragline Bucket, Buda-Lanova Diesel Power Engine rebuilt last season. Machine in good condition.

**WESTMONT Tractor & Equip. Co.**

150 E. Spruce St. Phone 6464  
MISSOULA, MONTANA

**FOR SALE**

- 2 Type H.A.F. 10-10 Gardner-Denver 21 & 13 & 14 Hrs. Air Compressors 1320 C.F.M. each.
- 1 Type H.A.F. 10-34 Gardner-Denver 19 & 11½ x 12 Hrs. Air Compressor 1000 C.F.M.
- 1 16-B Telamith Gyratory Crusher Serial 4637 with drive.
- 1 5½ ft. Symons Shorthand Crusher with drive and spare parts.
- 1 48" x 18" Telamith Apron Feeder with drive.
- 1 Marcy 8" x 12" Double End Rodmill Serial No. 398 incl. Rods.
- 1 Dorr Classifier Type D.S.F.X.B. Serial No. U.S. 13012 with 22" dia. Bowl and 8" x 39" Rake.
- 1 Lot of new screen cloth various sizes.
- 1 Sand Dryer—43" x 14" with drive and burner.
- 1 30" Conveyor with 30 H.P. Drive, troughing and return idlers.
- 2 Model 5 F.D. Euclid End Dump Trucks.
- 1 D-7 Caterpillar Tractor with Angle Dozer.
- 2 D-8 Caterpillar Tractors with Dozers.
- 1 Model K30 LeTourneau Rooter.
- 1 Grace Double Drum Sheep Foot Tamping Roller.
- 2 2 cu. yd. B&K Blaw-Knox Hand Operated Concrete Buckets.
- 1 Hand-gearred Hydraulic Crane, 5 ton, 20' span with Electric Hoist and Crane Runway.

Other items: Pumps, Motors and Transformers.

**MOUNT MORRIS DAM BUILDERS**

Box 25  
Mount Morris, New York  
Phone 298

**Reconditioned  
TOURNAPULLS & SCRAPERS**

Immediate Delivery—Attractive Price

FOUR SUPER C — CUMMINS ENGINES — ELECTRIC STARTERS — WITH "L.P." 12-16 YD. SCRAPERS — GOOD RUBBER — JUST OUT OF OUR SHOP — SALE OR RENT WITH PURCHASE OPTION

**RENTAL SERVICE CO.**

4th & Courtland Sts.

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"36 Years of Service"

**FOR SALE****ONE USED CLYDE MODEL**

HBT HOIST AND TOWER  
W/80' Tower 2 drum Clyde Hoist, Reconditioned. Wisconsin Gasoline Motor. Location: Springfield, Missouri.

TWO USED JAEGER 165 CONCRETE MIXERS  
One Rubber Mounted Rebuilt Wisconsin Gasoline Motor, A-1 Condition. Location: Eastern Kansas.

TWO 23 T WINSLOW  
2 Compartment Binebatch Units. Location: Eastern Kansas.

ONE USED CLETRAC MODEL H. G.  
GASOLINE Powered  
w/ ½ C. Y. Ware Hydraulic Loader, completely reconditioned, new 1960. Location: Missouri.

ONE OWENS ½ C. Y. Model 230 Clamshell Bucket, A-1 condition. Location: Eastern Kansas.

1—Byers Model 83 Crawler Crane, 55 ft. Boom. Caterpillar Engine.

All Prices F. O. B. Location

**MITCON  
EQUIPMENT CORP.**

P. O. Box 483 Telephone: 2-5545  
SPRINGFIELD, MISSOURI

**All Equipment is Priced  
for a Quick Sale:**

International TD 10 Tractor and Isaacson Hydraulic and Dozer.  
Lorain 40. ¾ yard with attachments.  
Two Wheel LeTourneau Crane.  
Four C11 Electric Tournapulls and Scraper. 1¼ yd. Lima Backhoe Attachment.  
International Tractor Model T 6 with Buckeye and Bull Dozer.  
Caterpillar D 6 Tractor and cable controlled shovel.  
15 yd. LV LeTourneau Scraper.

This equipment is in good condition and it is all located at:

7001 Southwest, St. Louis 17, Missouri  
Please call Mission 0153 or TE 3-6929  
ROY McCLANAHAN, President

**FOR SALE**

- 2—Universal Jaw Crushers 10 x 36. Serials 27543 and 27549
- 1—Chicago Pneumatic Air Compressor 315 C.F. Caterpillar Diesel D-8900 Power Unit

Above located in Wyoming

- 1—Universal Jaw Crusher 10 x 36, Serial 27521

- 3—Kochring Dumpsters Model W-55, Case Gasoline Power Units

- 1—Bucyrus-Erie Crane 1¼ Yard. GA-3 Model, Serial 11843. Powered by Wisconsin Gasoline Motor Model D-2

Above located in Wisconsin

- 1—Ingersoll-Rand Air Compressor. 315 C.F. Serial 40D-25126 with International Diesel Power Unit.

Above located in Alabama

**E. C. Schroeder Co., Inc.**  
McGREGOR, IOWA

**MURPHY DIESELS  
Priced to Sell**

- 1—ME8 radiator cooled with clutch & stub shaft. Power unit.
- 1—Set, 20 groove B sheave, 18" dia. Ball Bearing mounted. 6" not mounted for above.
- 1—ME88 radiator cooled E M Generator—180 KW. 220/440/3/60. 1200 R.P.M.
- 1—ME4 radiator cooled E M Generator—60 KW. 220/440/3/60. 1200 R.P.M.

IMMEDIATELY AVAILABLE

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Power Equipment Corp.

1370 W. Augusta Blvd., Chicago 22, Ill.

ALL PHONES—EVERGLADE 4-4511

**FOR SALE**

- American Model 75 Hoist with 1500' ½" Cable and Sauerman 1 cu. yd. heavy duty drag scraper bucket. Three blocks and 20' mast. E-4-20 Buda motor.

Priced complete as stated above

.....\$4,500.00

- 30" x 18" Portable Conveyor with 2 H.P. Electric motor and V-Belt drive. Priced .....\$500.00

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Phone Dial 4-4299 Evenings

**Write...  
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**For Our New Listings 300 ITEMS  
USED CONSTRUCTION EQUIPMENT  
AVAILABLE FOR IMMEDIATE DELIVERY**

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All Equipment Owned by

**JOHN FABICK TRACTOR COMPANY**

3100 GRAVOIS AVENUE

St. Louis 18, Missouri

**FOR SALE**

Concrete Mixer—Rex 14S, Serial No. H9574.  
Le Roi 4 cyl. gasoline motor. Four steel wheels.

Concrete Mixer—Rex 7S No. 237, Serial No. 40313. Le Roi 2 cyl. gasoline motor. Four steel wheels.

Finishing Machine—Whiteman Model B, 6" x 15", complete with finishing trowels. Wisconsin gasoline motor, Model HB.

Batcher Plant—Johnson 40 c.y., 2 bins w/mod. 1 Johnson scales, 5000 lbs. capacity.

1 pneumatic vibrator; 1 gasoline vibrator; 3 1½ yd. concrete buckets; Gunite machine, Model N1, Serial 4696; 3 wheelbarrow scales; 15 rubber & steel tired Georgia buggies; 6 rubber tired wheelbarrows. All used equipment in good condition. Can be seen at address below.

**FULTON CONSTRUCTION  
COMPANY**

P. O. Box 13197 2600 West Lamar  
Phone: JUstin 0649  
Houston 19, Texas

**FOR SALE**

2-54B-Bucyrus-Erie Drags. Serials 33220-33228; Light Plant, 2 yd. Drag buckets. Buda Diesel.

1-1201-Lima Drag-Sr. 3627, 80' Boom - Light Plant - Drag Bucket.

1-40A Marion Sr. 8237, 80' Boom - Light Plant - Drag Bucket.

1-Factory New N.W. & Shovel - Murphy Diesel.

1-Factory New Hi-Lift Shovel-Front for 54B. All above priced for quick sale and quantity.

**Ray S. Black**

16 S. Bellegrove Rd., Ft. Cottonville 0589  
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**FOR SALE**

**USED EQUIPMENT**

- 1 Ditcher, Buckeye 180, qns.
- 1 Scraper, Hail 11-13 Yd.
- 1 Scraper, Hail 14-18 Yd.
- 2 Diggers, LeT with PCU for Cat. D7.
- 1 Magnet, Electric Controller 38"
- 1 Clam Bucket, Blaw Knox 1½ Yd.
- 1 Crankshaft Grader Lemper - 103"

**NEW EQUIPMENT**

- 1 Front-end Loader, M.M.-UTIL w/Ottawa ¾ yd.
- 5 Crawler Tractors, "TERRATHAC", GT 15
- 2 Clam Buckets, ¾ Yd. and ½ Yd.

All items on your yard

**Statham Machinery & Equip. Co.**  
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Egin 2461

**FOR SALE**

Four Insley semi-trailer wagons for hauling aggregates or dirt; single tires; vacuum brakes. All in good condition.

**M. W. WATSON, General Contractor**  
1004 National Bank of Topeka Bldg.  
Topeka, Kansas

**FOR SALE**

**SHOVELS & DRAGLINES**

1-P & H model 1489 Elec. Shovel 3½ cubic yd. with 48 ft. boom, 34 ft. sticks 4100/3, 60, New 1940 A-1 condition.

LIMA #1201 Dragline, 65' boom, 3 cu. yd. bucket. Cummins diesel, 1945 machine.

LORAIN #L-620 Shovel, Drag and Crane Combination, Waukesha diesel, serial #18,000, excellent condition.

LORAIN Crane TL-20 "Moto Crane." General Motors diesel, 30' boom on 6 x 4 carrier truck, G.M. diesel serial #17,000, 6½ tons capacity.

1-320-B Bucyrus Erie Elec. Shovel Crawler, 4180/3, 60, Equipped 72 ft. boom, 54 ft. Dipper Handle, 42 cu. yd. bucket.

MARION #48A Dragline, 90' boom, 3 cu. yd., Buda diesel, air operated, excellent condition.

BUCYRUS ERIC #1200 Dragline, 100' boom, 5 cu. yd. bucket, General Electric motor generator set, serial #17,000.

BUCYRUS ERIC #129B Shovel, 8 cu. yd. standard shovel front.

TRUCKS, TRACTORS, ETC.

10-Catlift Trucks, Model FD, 10 yd., 15 ton, rock type bodies, and dump with Cummins diesel engine.

1-50 Caterpillar Tractor with chain operated angle blade, serial #1M926, rebuilt.

1-HD19 Allis Chalmers, new motor, with pushplate, low hours.

1-Cletrac, SDE, with Hail hydraulic blade, rebuilt.

**MISCELLANEOUS**

233 ft. of used 24" 4-gly, ½" top cover conveyor belt, equivalent to new.

1 Ingersoll Rand, Worthington CFM, Portable Diesel Air Compressor.

1-Ditcher #160 Buckeye, 24" to 48", ladder type, 16' depth, Buda diesel, new in '51.

1-400 H.P. Westinghouse, type CW, 514 RPM, 2200 volt motor.

1-75 H.P. Westinghouse, type CW, 580 RPM, frame 86A, slipring motor with control.

3-80 H.P. ball bearings, 1200 RPM, 225/400 volt motors.

9-42T Bucyrus Erie Drills, diesel and electric.

1-Coal Stacker and Car Unloader complete, new in 1946, very little use.

**CHARLES V. FISH CO.**

Commonwealth Building

ALLENTOWN, PENNA.

Phone 54701

**FOR SALE**

1-Buckeye utility ditcher, mdl. 406; 2 yrs. old. Cuts 17-24 in., max. depth, 8-ft. Has 6-cyl. Continental eng. \$5,500.

1-Chicago Pneumatic air compressor with Hercules OXD-5 eng., 105-cu. cap., with two 90-lb. pvmt. breakers and 100-ft. of hose. Excellent condition. Rubber tire mtd. \$1,500.

1-Tulsa winch, mdl. 21L, 12,000-lb. cap., with power take-off. Excellent condition. \$200.

1-Buda eng. mdl. HP-326, Cotta transmission. Good condition. \$500.

See

**Jimmy James or Wm. White**

**H. B. Layne Contractor, Inc.**

**S. Burnett Rd., Springfield, O.**

Phone: 5-3201

**EQUIPMENT  
FOR SALE**

**BY CONTRACTOR**

1-Allis-Chalmers AD-3 Motor Grader, Closed Cab, V type Scissor, Newly Painted, New Tires and in A-1 Condition. New in 1948. \$4,750.00

1-Caterpillar #112 Motor Grader, Serial No. 2M-782, Newly Painted, Good Tires in A-1 Condition. 4,250.00

1-Allis-Chalmers HD-19 Tractor, with Garwood D.D.P.C.U. & Garwood Angledrzer, in very good condition. 11,000.00

2-DW-10 Tractors & W-10 Wagons, Serial Nos. 1N242 & 1N2441, Good Tires, Tractors Recently Rebuilt, each 4,750.00

1-Model K Allis-Chalmers Tractor, Wide Gauge, Electric Starter, Newly Painted, Brand new Motor Kit, HD-7 Tracks, Rollers & Idlers. 800.00

1-Model L Allis-Chalmers Tractor, Electric Starter, HD-14 Tracks, Rollers and Idlers, Good Condition, A Real Bargain 703.00

1-Caterpillar 60 Tractor, Wide Gauge, 22" Tracks, Good Throughout 500.00

1-Garwood Model C-80 Ripper, Newly Painted, in A-1 condition 950.00

1-Dew Claw Road Plow, Newly Painted and Ready to go. A Real Bargain 250.00

1-Gasoline Table Saw Powered by Wisconsin Air Cooled Engine, Serial No. 06961, Good Condition 150.00

1-Winslow 4 Beam Wheelbarrow Scales, Used very little. A Real Bargain 125.00

1-Spawdonatic Electric Hand Saw, Good Condition 75.00

1-Jackson Concrete Vibrator, Serial No. 10153, Good Condition 125.00

1-Rex 11-B Concrete Mixer, Serial No. KG-146, Trailer Mounted, Wisconsin V-4 Air Cooled Engine, Tires - 738 x 16 (7), Good Condition 950.00

1-Hercules Three-Wheel Steel Wheel Roller, 7½ tons, Hercules Engine, Model JXB, Serial No. 1108, As is 493.00

1-Littelford Steam Tank Car Heater with Steam Cleaning Attachments, Used very little 1,800.00

2-Garwood 311 Scrapers (11 cu. yd.) Same as new, each 4,250.00

**Graves Brothers**

P. O. Box 71

PINE BLUFF, ARKANSAS

Day Phone 6458

Night Phone 1730 & 3556-W

**FOR SALE—SHOVEL**

P & H, Model 655-A, 1½ cu. yd. with manganese bucket. Powered by Cat D13000 engine. New tracks last year. Extra shovel stick and quite a few spare parts. In very good condition.

**GIBBS-COOK TRACTOR**

**& EQUIP. CO.**

1314 Walnut

Des Moines, Iowa

## Pioneer Screening Plant

### — CONSISTING OF —

ONE (1) PIONEER 30"x50" Portable Conveyor complete with belt mounted on Hydraulic Cradle Truck with Tumbler Shaft Drive, with Tail Shaft extended for driving Feeder.

ONE (1) PIONEER 4"x12" Vibrating Screen, two-deck with 3" square openings.

ONE (1) Bin Mounting.

ONE (1) Motor Mounting.

ONE (1) V-Belt Drive.

ONE (1) Model 30R Rock Feeder, complete with drive.

ONE (1) 21-Yard Steel Bin on Rigid Legs.

ONE (1) Special Loading Pocket.

ONE (1) Sloping Grizzly with 8" spacing.

TWO (2) Allis-Chalmers B-125 Gasoline Engines.

This plant has screened less than 30,000 yards and is in perfect condition.

### SWEENEY BROS. TRACTOR CO.

1622 Front St., Fargo, No. Dakota

16" x 16" New Holland Roll.  
14" x 26" Acme Jaw Crusher.  
No. 4 and 4 1/2 Champion Jaw Crusher.  
36" Gyrsphere TelSmith Crusher.  
40" Gyrsphere TelSmith Crusher.  
3' x 10' Triple Deck TelSmith Screen.  
3' x 10' Double Deck Seco Washing Screen.  
3' x 6' Single Deck Seco Washing Screen.  
20" x 15" Sand Screen.  
36" x 20" Sand Screen.  
36" x 15" Sand Drag Cedar Rapids.  
18" x 60" Portable Barber-Greene Conveyor.  
Lot of Motors.  
Conveyor Belting.  
Stearns Block Machine C-727.  
Lot of Pallets 12" x 16".  
24" Gauge Cars.  
Lot of Tracks.  
21 Cu. Ft. Blystone Mixers.  
1-14 Cu. Ft. Blystone Mixer.

### BLUE BALL MACHINE WORKS Blue Ball, Pennsylvania

Euclid Trucks 15 Ton—22 Ton End Dump—15 Yd. and 25 Yd. Bottom Dumps—12—25 Yd. Bot. Dump without tractors.  
4—Elec. Std. Ga. Dump Car locomotives—600 volt with 12—60, 84, 40 dump cars—25,000 lb. cap. 130 Cu. Ft. load, with all elec. equip. Goodman 16 Ton Mine Loco—250 Volt 36" Gauge Ottumwa Mine Hoist—1 1/2" Rope—200 H.P. Motor—525 R.P.M. complete.  
Jaw Crushers 36" x 48" Nordberg—36" x 48" Farrel—60" x 80"—42" x 60"—42" x 30"—24" x 36"—18" x 36"—15" x 36" Symons Cone 5 1/2"—4"—3"—2"—50 x 20 Die Hammer mill—54" Traylor Type T—42" McCully—48" Gyrospheres.  
Shovels—Roll Crushers—Roll Mills—Ball Mills—Rolling Kinks—Dryers—Log Washers—Classifiers—Mine Hoists—Transformers—Motors—Gravel Plants—Blast Hole Drills—27"—20"—42"—Generator sets—Drag Lines, 2—25" A.C. Log Washers.

**STANLEY B. TROYER**  
Theatre Bldg. Tel. 588 Crosby, Minnesota

### FOR SALE

1—1 1/2 yd. Link Belt Crawler, K376, 1500 hrs., A-1 Condition \$30,000.00  
1—1/2 yd. Good Crawler, Mod. 200, Ser. 4313, snused surplus 5,000.00  
1—Chicago Pneumatic Compressor, 315 CFM, pneumatic tires 2,800.00  
2—1/2 yd. P&H Crawler, Mod. 150, Ser. 7388 & 7391, surplus, as-is. ea. 2,250.00  
1—P&H Mod. 255A Crawler Base Assy., complete, new 3,000.00  
1—Cat. D-4 Skiploader, Ser. 723456, Running Condition 3,500.00  
1—Federal Truck Tractor, w/winch, 4x6, Cummins 150 Diesel, A-1, completely overhauled, new cab. 6,500.00  
1—Rogers Low Bed Trailer, 60 ton, w/dolly, 24 tires, 16 foot 5,000.00  
1—Clamshell, 2 1/2 yd., Johnson type N, gen. purpose, 95% new 1,600.00

SWAGER-KRISHUN COMPANY

8771 San Fernando Rd.

Sun Valley (Los Angeles), Calif.

CHase 7-8411

## FOR SALE

2 Euclid model 49 FD rear dump trucks approximately 4 years old, GMC diesel engines. Good rubber.  
1 D-8 Cable controlled angledoser, late 2U series.  
1 Lorain 82 Shovel. Standard front - 2 yard dipper.  
1 Buckeye Model 70; 3/4 yard Shovel. gasoline engine, standard front.  
1 2 yard AMSCO dragbucket.  
1 1 1/2 yard AMSCO dragbucket.  
2 2 yard Blow-Knox clambuckets, complete with teeth and counterweights.  
1 Cietrac bulldozer, model FD, Hercules diesel engine.  
1 Battery Locomotive, low coal, 3 ton 36 inch gauge. Battery charging outfit.  
1 Jeffrey cutting machine, 35-L, 50 h.p., 220 A.C. 3 phase, 60 cycle, height 19 inches. This machine never used.  
1 Lot approximately 15000 feet 4/0 insulated copper wire. New on reels.

All above stripping equipment now being operated on coal stripping job by owner and seller in Clearfield County, Pa.

### CENTRAL MOSHANNON COAL MINING CO.

Houtsdale, Pa. - Phone 4013

## FOR SALE

1—1950 3/4 yd. Insley Dragline, Model L, 40 foot boom, fairlead, swamp pads, diesel power, like new.  
1—No. 12 Caterpillar Motor Grader Serial No. 8T81, scarifier, cab, lights, 100 H.P.

**G. H. LINDEKUGEL & SONS  
MITCHELL, SOUTH DAKOTA  
PHONE: 900**

### FOR SALE

1—Jaeger 100 concrete mixer mounted on pneumatic tired chassis. Used very little.  
1—Mortar mixer—like new.  
1—Clipper brick saw. Used very little.  
1—Whitman cement floor troweling machine.  
1—2 1/2 in. trench pump—like new.  
1—240 Buhi air compressor on 4 pneumatic tires.  
1—Material Hoist.  
This equipment and many other items can be seen by contacting E. H. REGAL CO., 563 Acme St., Green Bay, Phone Adams 1987.

### FOR SALE

Chicago Pneumatic Diesel Engine RHA—40D, Serial No. 19785, 120 H.P. Good operating condition. Complete with fuel tank, starting unit, spare parts, etc.  
Arvenia-Buckingham Slat Co., Inc.  
Phone Mr. Yancey, Dillwyn 42F24  
or write Arvenia, Virginia

### FOR SALE

Motor Patrol, Allis-Chalmers Model 83, tandem drive with 12" blade, powered with GM Diesel engine; engine and transmission completely overhauled; good tires.  
Scraper, Gar Wood Model 515, 12-15 yds., with four 18-00x24 tires.  
Scraper, LeTourneau Model FU, 17-23 yds., with two 18-00x24 tires and two 24-00x29 tires.  
Diesel engine, Ruda 6DT468, complete with steel housing and clutch.

### PHILLIPPI EQUIP. CO.

360 Heaver St. N.E., Minneapolis  
Ph. Gladstone 5931

### FOR SALE

1—#95 Diamond Portable Crushing and Screening Plant with Feeder Conveyor and Hopper.  
1—125 H.P. Allis-Chalmers Electric Motor with Controls.  
1—27 C.Y. Jacking Bin.  
1—5' x 12' Diamond Drag Washer.  
1—220 V. Vertical Capstan Carspotter.  
200' 24" Pioneer Conveyor.

At Yard in Billings, Montana

### HITZ CONSTRUCTION CO.

2111 - 4th Ave. N. Billings, Montana  
Phone 3-3311

### FOR SALE

"Caterpillar" D-6 Serial No. 9-U-2108 w/ Traxson cable loader working everyday  
\$8,500.00

### RIEMER BROTHERS, INC.

6301 W. Fletcher Chicago 34, Ill.  
National 2-3636

### FOR SALE

One (1) 1946 Model Hanson shovel purchased new in 1947... \$ 5,500.00  
One (1) 34E Koehring single drum paver, model 140ES, Serial #494452... 10,000.00  
One (1) Stearns Locomotive Crane, Industrial Brownhoist, capacity 24,500 lbs., price on request.

All Above Equipment F.O.B. Minnesota points

### Claude B. Butler

824 Providence Bldg.  
DULUTH, MINNESOTA

### DIESEL ENGINES

Fairbanks Morse Diesel Engines  
160 HP Type Y, \$450.00. 150 HP Type Y \$650.00 with mufflers. 50 KVA Alternator 230 volts at 257 speed... \$250.00

### H. L. HARVEY

307 N.E. 21st Street, Fort Worth, Texas



BARBER-GREENE Model 842 Bituminous Mixer, 60-70 TPH Capacity, complete with hot elevator. Unused.

KEWANEE Boiler, approximately 80 H.P., perfect.

**PRIESTER MACHINERY COMPANY**

Post Office Box 310  
Phone 5-6885  
Memphis, Tennessee

**For Sale to Close Estate  
Road Construction Equipment**

- 1-1942 International R7 truck.
- 1-1940 Ford longwheel base with dump.
- 1-1948 Ken truck, damaged.
- 1-1950 197 Gar Wood Hydraulic Scraper.
- 1-1950 212 double drum scraper.
- 1-Gar Wood Mixer.
- 1-1941 Ford 217T4-TD18 International Tractor.
- 1-Homestead Lowboy Trailer.
- 1-8 yd. Wheelbarrow Crane Scraper.
- 1-HD 10-W-9431 LeTourneau (1948 Model). (Serial #P31321 & #P31322, 87901, KD 78 Motor).
- 1-TD 9-TDC-8-996374 International Tractor, W 1 (Gasoline Motor 200 HP Serial #80381).
- 1-Fordson Tractor #204904 W Dearborn loader, Mod. 19-A Serial #7745.

For further information call—Telephone 4697 or 9675, Rochester, Minnesota or write Mrs. Virtie Braut, 815-6th Ave. N.W., Rochester, Minnesota.

**FOR SALE**

- 1-Super C Tournapull
- 1-Murphy ME 650 Generator Set
- 1-Caterpillar D17000 Power Unit
- 1-Gar Wood L12 Hydraulic Scraper with controls
- 1-9 x 16 Jaw Crusher

**Contractors Machinery Co.**

530 Monroe Ave., N.W.  
GRAND RAPIDS 2, MICH.  
Phones 6-1197, 6-1279

**FOR SALE**

We have an INTERNATIONAL TD-14, wide tread, 16" track, crankcase guard, radiator guard, front pull hitch with Hughes-Keenan WCIR Reassembled crane—14' boom—270° swing. Tractor motor, steering clutches, driving clutch, completely rebuilt—guaranteed. Crane driving mechanism rebuilt—guaranteed. Tractor drive used very little.

\$10,000, F.O.B. Albertville, Alabama

**SAND MOUNTAIN TRUCK & TRACTOR CO.**

ALBANYVILLE, ALA.  
Phone 252

**NORTHWEST SHOVEL**

MODEL 80 D—MODEL 5—MODEL 25 These shovels working every day, all in excellent condition. Will sell any one of the three as I have more equipment than I need.

E. E. FELLER COAL CO., INC.  
Box 35, Western Port, Maryland  
Phone Western Port 26321

**FOR SALE**

LINK-BELT K-375 Dragline, 2 Yard Bucket, 60-70 ft. boom.

LORAIN SHOVEL, Model 77, Yard and Half dipper.

D-8 and D-7 Tractors.

F. E. WELSH  
2820 Ludlow Road, Cleveland, Ohio

**JAEGER BITUMINOUS PAVER  
FOR SALE**

SN 49X231. BP-5 Factory Reconditioned demonstrator with heating attachment and all standard equipment, mounted on 10 foot steel crawlers, powered with Continental model F-226 gas engine SN 52515.

Price \$11,500.00

f.o.b. TOPEKA, KANSAS

**KAW PAVING COMPANY, INC.**

**FOR SALE**

**BYERS Model 61**

**Traveler Dragline 1/2 Yard**

Serial No. 6286. Hercules 4 cyl. Gasoline Engine, 30 ft. Boom, 1/2 yard Bucket. Machine has been used less than 30 days.

**REASONABLE**

Must be seen to appreciate this terrific buy

**SWEENEY BROTHERS  
TRACTOR CO.  
FARGO, NORTH DAKOTA  
Ph. 2-3306**

**FOR SALE**

ALLIS-CHALMERS HD-14, 68" tread, 22" shoes, front pull hook, crankcase guard, sprocket rock deflector, elec. starter, Baker hydr. angledozer w/side mounted pump, radiator shutter and guard, Buckeye GLT double drum PCU.

**SERVICE SUPPLY  
CO., CORP.**

20th AT ERIE  
PHILADELPHIA, PA.  
Phone: Baldwin 9-1950

**FOR SALE**

One P & H 3-87 Diesel Engine Complete with Clutch. Brand new, priced to sell.

**Construction Machinery & Supply Company, Inc.**

128 South St. Clair Street  
Toledo, Ohio

**FOR SALE**

Gravel and sand business for sale with ten acre pit and full line of heavy equipment currently in operation. Ideal opportunity for Ready-Mix.

**HARRINGTON REALTY**

Lyons, Wisc. Ph. Burlington 197

**WANTED  
AT ONCE**

Two complete Power Plants, used and in good condition. Model 32-E-12, 12" bore, 15" stroke, 3 cyl. Fairbanks-Morse, 360 rpm, 180 brake HP. Generator 3 phase, 60 cycles, 220/440 volts.

**LISS EQUIPMENT**

2233 NW 1st Ct., Miami, Fla.

**FOR SALE**

1950 Unit Model 557 1/2 C.Y. Rubber Mounted Backhoe with Four Wheel Drive. In new condition, used less than 400 hours.

**AMERICAN CONSTRUCTION CO., INC.**  
100 Airport Road, Hartford, Conn.  
Tel. 46-2531

**FOR SALE**

Cat 12 Motor Grader, Excellent Condition. 1/2 Yd. General Shovel. Good Operating Condition.

HD10W Tractor w/Cable Blade, Al.  
**CENTRAL SUPPLY & EQUIP. CO., INC.**  
DANVILLE, KENTUCKY



Due to ill health of the owner, all the equipment of the Eidson Construction Company must be sold. No reasonable offer will be refused. The major items are as follows:

- 3 LeTourneau Super "C's"—3-CT Series—with Cummins Diesel Motors
- 2 Heiliners, 800 Models, with Cummins Diesel Motors
- 2 LeTourneau Model C-11 Tournapulls—B-62 Series—with Buda Diesel Engines
- 2 HD-19 Tractors—recent Series
- 3 D-8 Tractors—2U and 8R Series
- 2 HD-14 Tractors
- 1 HD-10 Tractor
- 1 Adams 610 Motor Grader
- 1 Adams 512 Motor Grader
- 1 Caterpillar 112 Motor Grader—3U Series
- 1 Caterpillar 12 Motor Grader—8T Series
- 2 515 Garwood Scraper Wagons
- 1 205 Koehring Crane, Serial C-7507, with  $\frac{3}{4}$  Yard Hendrix Bucket (new)
- 1 304 Koehring Crane, Serial C-7419, with 1 Yard Hendrix Bucket (new)
- 1 La Crosse 25 Ton Semi-trailer (new)

Many other items such as Rippers, Rollers, Compressors, Pumps, Trucks, etc.

Any contractor interested in taking over the entire business, sale can be arranged on terms so that the business should pay for itself in one year. Organization still intact. Plenty of business available. Would need supervision and some cash. Anyone interested in acquiring this equipment or business should contact Robert S. McNeill, Attorney-at-Law, telephone 273; or Eidson Construction Company, telephone 118, Mocksville, North Carolina.

### FOR SALE

Wagon, Rock, Athey—Model PD-10  
Wagon, Dirt, Caterpillar—Model W10  
Tractor, D35 Caterpillar  
Conveyor Belt 30' x 40'  
Mixer, Jaeger, Model 75  
Mixer, Jaeger, Model 35  
3 Yd., Butler Wheelbarrow Bin Hopper  
Inley Dragline—Model K12  
Gallon Roller, 3 Wheel  
Jaeger Air Compressor—185  
Tower—90' Archer

L. W. Riney Construction Co.  
HANNIBAL, MISSOURI

### FOR SALE

1—LPC C14 scraper with 21.00 tires, excellent condition, \$5500.00  
4—Cat. DW10 tractors with LPC hydraulic scrapers. These machines in good condition and priced to sell.

CLEM FLEURY EQUIPMENT CO.

Phone 4-0225

Cedar Rapids - - - Iowa

## MALE HELP WANTED

If you are working at present and desirous of making a change we will be glad to receive your application for an EXPERIENCED ENGINEER THOROUGHLY FAMILIAR WITH ALL PHASES OF ROAD, BRIDGE, AIRPORTS AND WATER MAINS & DRAINAGE CONTRACTING WORK. MUST BE ABLE TO TAKE COMPLETE CHARGE OF ALL WORK IN PROGRESS, SUPERVISE MEN, ALLOCATE AND HAVE EQUIPMENT IN TOP WORKING ORDER. IF YOU CAN LAY-OUT WORK AND ARE WILLING TO TAKE THE RESPONSIBILITIES OF THE ABOVE REQUIREMENTS THE SALARY IS OPEN TO YOU. ONLY THOSE THAT MEET THESE REQUIREMENTS NEED APPLY. ALL REPLIES IN STRICTEST CONFIDENCE. PERMANENT WORK.

PHONE OR WRITE

Joseph Bonavita, 60 Acushnet Avenue, Springfield, Mass.

Phone 7-4233 between 7 and 8 P.M. only

## For Sale

- 1—Osgood truck crane, tandem axle drive
- 2—Grain evacuators with electric motors
- 1—Ingersoll-Rand double drum winch
- 1—Brown Duval moisture tester
- 1—12" belt conveyor
- 1—Owatonna elevator 42'
- 1—Reeves vari-speed motor drive 5 HP motor
- 1—Sturtevant silentvane fan size 95
- 7—Motors 3 phase 60 cycle 220-440 volts

OLLIE E. LAWRENCE

BOX 688

QUINCY, MICHIGAN

## FOR SALE

New 38-B Bucyrus Erie combination Crane and Dragline

ORR CONSTRUCTION  
COMPANY

27 E. 19th Place,

Chicago Heights, Illinois

Telephone: Skyline 5-9090

## FOR SALE

Used road grader. Galion IHC hydraulic control Model G16724A. International engine. All 6 tires in excellent condition. Road grader shows little wear.

THE DUNLAP CO.

Williamsport, Ohio

Phone 74

## BARGAIN FOR SALE

1—TD-18 International Tractor 12' cable control blade. New 1946. Splendid condition.  
Price \$4900.00

WALLER PAVING CO.

Salisbury, Md.

Phone: 7691

## FOR SALE

1950 IHC model LF 190 tandem tractors, 1949 IHC model K8SF tandem tractors. Excellent condition, ready for work. Hendrickson tandems and completely equipped with fifth wheel, heater, defroster, HD generator, automatic radiator shutters, air horns and spot light.

—See or Call—

MR. DENKOFF

Ruan Transport  
Corp.

408 S. E. 30th Des Moines, Iowa

LAPLANT-CHOATE TS-300 Motor Scrapers (3 units) with Buda Diesel Engines.

LAPLANT-CHOATE TW-300 Motor Wagon (1 unit) with Buda Diesel Engine.

Immediately Available

Priester Machinery Company

249 So. Third St.

Phone 5-6885

Memphis, Tennessee

## FOR SALE

Available for Immediate Delivery  
Excellent Condition

1—7 1/2' 6" Heavy Duty Two Compartment Beaver Tower complete with hoist and accessories including concrete bucket and receiving hopper.

1—49' 6" Heavy Duty Two Compartment Beaver Tower complete with hoist and accessories including concrete bucket and receiving hopper.

—Write, Wire or Phone—  
WES MIDDLETON

Western Machinery Co.

1004 Speer Blvd. Main 1288  
DENVER, COLORADO

## FOR SALE

- 1—Used Caterpillar Tractor D7 with angulometer, 7M series.
- 1—Used Caterpillar Tractor D4 with angulometer, late series.
- 1—Used Alita Chalmers Tractor HD14.
- 1—Used General 10 ton McMillan rubber lined crane.
- 2—Used Inley 14 yd. grapple crane, diesel, one equipped as a grapple, late models.
- 2—Used Inley Gas Cranes, one equipped as a backhoe, late models.
- 1—Used Lorain 14 yd. yd. diesel crane.
- 1—Used Bucyrus Erie 125, combination shovel, crane and backhoe, late model.
- 1—Used Link Belt Speeder, model L540, 54 yd. shovel and crane.
- 3—Used 800 foot Ingersoll Rand Diesel Air Compressors.

All above equipment in good used condition at the right price.

NATIONAL MACHINERY COMPANY

"Try us first, for good, dependable equipment  
PHONE, WRITE OR WIRE  
P.O. BOX 2306  
NORFOLK 1, VA. PHONE: NORFOLK 8107

# FOR SALE

Cleaver-Brooks one-car Tank Car Heater, mounted on 1939 Ford Truck. Both units in excellent operating condition. 1952 Boiler Inspection.

**Price—\$1000.00**

Inspection may be made at our garage, Route 145, Cairo, New York

**WESTCHESTER ASPHALT DISTRIBUTING CORP.**

Water St., White Plains, N. Y.

Tel. White Plains 9-0540

# CONTRACTORS ATTENTION

## TOOL SHEDS—FIELD OFFICES—BUNK HOUSES

We bought 40 Fruehauf, 26 ft., single axle vans. All very clean, with excellent rubber.

**While they last \$850.00**

Each one over \$1200.00 value.

**Blewett Hanson Trailer Sales**

2910 University Ave. S.E.

Minneapolis,

Minn.

Gladstone 7959



**A REAL ELECTRIC AUTO  
For YOUR Child!**

Plenty of power for hills, towing wagons, etc. Send for free catalog.

**MYSTIC RIVER SALES CO.**

DEPT. V-6, MYSTIC, CONN.

# FOR SALE

Used Steel I Beams—3/4" web  
4—20" h., 8" fl., 16' L.  
4—24" h., 7 1/2" fl., 25' L.  
2—24" h., 7 1/2" fl., 24' L.  
1—24" h., 7 1/2" fl., 24' L.  
2—20" h., 8" fl., 46' L.

Used Plate Girder Spans

4—21'7" L., 14" w.

All in good condition

FOB on site: Eastern Pa.

Address inquiries to:

**T. F. SCHOLES, INC.**

P. O. Box 112, Reading, Pa.

# FOR SALE

## TWO COMPLETE STEEL STIFF LEG DERRICKS

Each having 75 foot boom, 3 drum Buffalo Hoist, 75 HP motor, with derrick house and electrical control.

**ACORN IRON & SUPPLY CO.**

915 N. Delaware Ave.

Philadelphia 23, Pa.

# For Immediate Sale

Hetherington & Berner Motor-Paver. Purchased in 1949—Has paved only 32 miles of road. Reason for selling, because of financial limitations on bituminous construction. In good repair—ready for use—has been serviced since last job—priced to sell—as is—F.O.B. Lake City, Michigan.

**Missaukee County Road Commission  
Lake City, Michigan**

**B. D. JEFFS, CHAIRMAN**

We reserve the right to reject any or all offers and subject to prior sale.

# We do a Nation-Wide business in STEEL SHEET PILING

## IMMEDIATE SHIPMENT

485 pcs. 85-20 ft. Beth. SP-6A-Maryland  
240 pcs. 60 ft. Carr. MP-116-Illinois  
215 pcs. 50 ft. Larsen 111 New-Florida  
173 pcs. 48 ft. Inland I-23-Chicago  
88 pcs. 30 ft. Inland I-23-Mississippi

Other lengths & sections used & new at other locations in United States for rent.

We have Nation-wide reputation for effecting QUICKEST SHIPMENTS

All sizes Vulcan & McKiernan Pile Hammers & Extractors for rent—Shop Rebuilt

Regardless of location of job. Wire, Write or Phone

**MISSISSIPPI VALLEY EQUIPMENT CO**

509 Locust St., Chestnut 4474, St. Louis, Mo.

# FOR SALE

1 Standard H & B 60" x 24 dryer complete with combustion chamber, dryer motor and drive, exhaust fan and motor, cold elevator motor, 1 5" Hauck low pressure burner, no turbine.

1 Clarkmoore asphalt road heater on Diamond T. Truck.

Both items in perfect condition.

Please call the writer concerning this advertisement.

**MR. T. A. CREEDON**

**THE SICILIAN ASPHALT PAVING CO.**

41 Park Row

Ph. Co. 7-0930

New York 7, N.Y.

# IMMEDIATE DELIVERY

1—Allis-Chalmers Model HD7W tractor w/ Gar Wood Bulldozer.

1—Allis-Chalmers Model B tractor with mower.

1—"Caterpillar" Model 212 motor grader.

1—Bros Model SG-55 skid mounted steam generator.

1—LeTourneau 3 1/2 cu. yd. scraper. Very clean.

1—Novo traffic line marker.

1—Titan chain saw.

1—Adams 414 Tandem drive motor grader, like new.

# ILLINOIS ROAD EQUIPMENT CO.

1310 East Jefferson Street

SPRINGFIELD, ILLINOIS

Phone 2-7709

# WANTED

1. 10 Ton capacity tilt top or goose-neck trailer "any width".
2. A.C. Model W Maintainer.
3. 500 to 600 Gallon Bituminous Distributor.
4. D-4 Hydraulic Tractor.
5. 1 1/2 c.y. light weight, wide rehandling clam bucket.

**We have for sale the following equipment:**

	Model	
1. D-2 Caterpillar tractor and dozer	1949	\$3350.00
2. Gardner Denver Wagon Drill	1951	1550.00
3. McKiernan-Terry 500 # sheeting hammer	1936	650.00
4. Rapid Paving Breaker, "Model 11"	1946	27.50
5. Owl Transverse Joint Cutter rebuilt 1951.		2950.00
6. Cleveland Longitudinal Joint Cutter	1942	550.00
7. Cleveland Push Planner	1942	1000.00
8. Cleveland Pull Planner	1942	600.00
9. Cleveland Form Grader Gas engine	1935	2500.00
10. Truck Turn table	1935	1000.00
11. Jiffy Steel Mast with concrete hopper	1942	500.00
12. Adman Blacktop Paver-by draulic-rebuilt 1951.	1940	5000.00
13. 6 ton Converted Gas. roller	1947	950.00
14. 5 ton 3 wheel Huber roller	1935	1250.00
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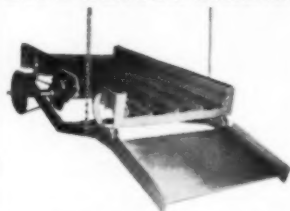
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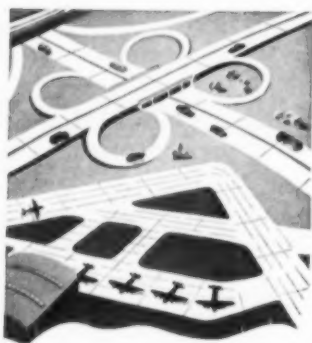
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